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Rail-Road News.

State Line Railroad.

The stock holders and others interested in the different lines of railway from Albany to Buffalo, have held a meeting recently at Syracuse, at which the subscription to the stock of the State line road from Buffalo to Erie was all taken, and the books closed. There was a spirited competition for the stock, and immediately after the books closed, it appreciated five per cent. The completion of the road is now secured. Its length will be sixty-seven miles, and it is to be finished by the first day of September next. One citizen of Buffalo took stock to the value of $50,000.

Vermont Railroads.

The Passumpsic Railroad, 61 miles in length, has been extended to St Johnsburg. The entire cost of construction and equipment is $1,650,000, making a little more than $27,000 per mile. The Vermont and Canada Railroad will, it is said, be completed to Rouse's Point in a few days. The cars now run to Missisquoi Bay bridge, which is only seven miles from Rouse's Point, and the iron is already laid over more than half this distance.

Albany and Buffalo Railroads.

The several railroad companies between Albany and Buffalo intend to run three daily passenger trains on their roads during this winter, and the fare is to be reduced on the route to $9,50—which is a discount of half a cent per mile on the present rates. The arrangement is to take effect on the 15th inst.

Tennessee and Georgia Railroads.

The ship India, from Pill, England, which reached Savannah, Georgia, a few days since, brought 3,208 bars of iron for the above named road.

Electro Magnetic Locomotive.

The Report of the Secretary of the Navy states that the experiments of Professor Page, in testing the application of electro-magnetism as a motive power, in mechanics, have been continued since his report, made in compliance with a resolution of the Senate in September last, by the virtue of the approbation of March 3, 1849, and he is now engaged in preparation for a trial trip of a locomotive on a railroad propelled by this power.

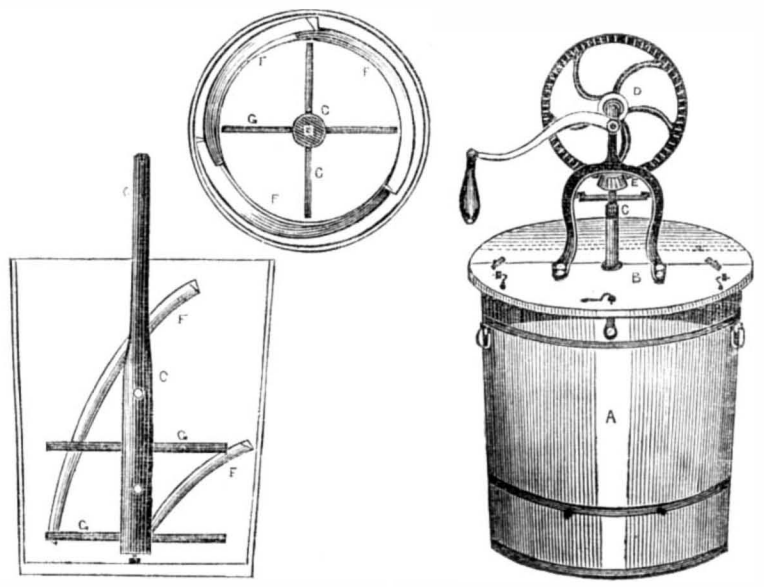
Round Wood Box Machines.

Mr. George W. Carleton, of Brunswick, Maine, informs us that Mr. Asa Fessenden, of Baldwinville, Mass., is the inventor of a "Round Wood Box Machine," one of which is running at Brunswick, by E. Byam & Co. He says, "it is a beautiful thing, and a credit to the ingenious inventor. It receives a wood bolt at each of the four corners, and cuts covers and boxes at the same time, and will cut six gross in one hour.

A Subscriber should read our articles in Vol. 5, on the sinking of lead in water. It will sink to the bottom.

NEW PATENT CHURN.

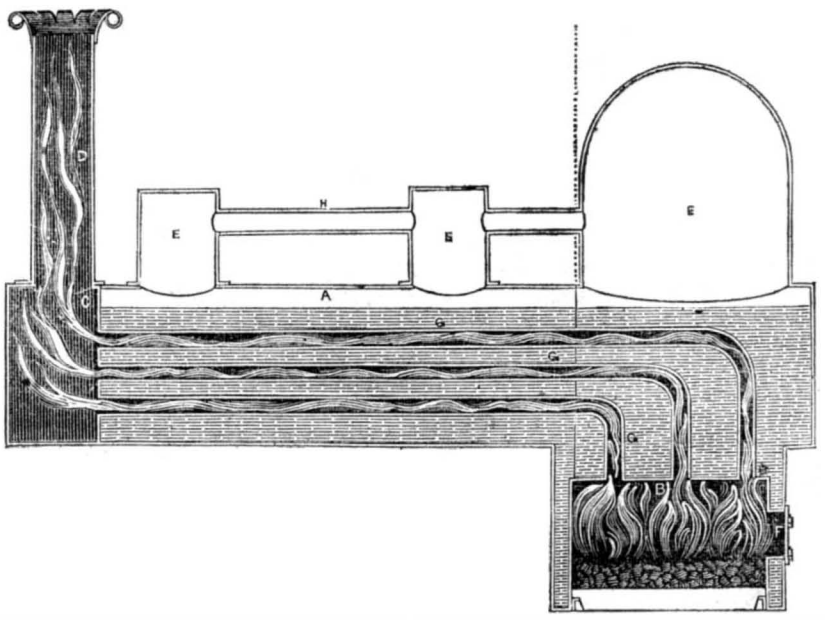
Figure 3. Figure 2. Figure 1.



The accompany engravings represent an improved churn, the invention of Messrs. George E. Gill & Joseph B. Tillinghast, of Chillicothe, Ohio, which was secured to them by patent on the 14th of last June.

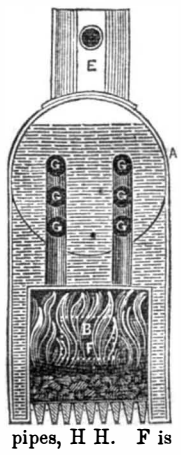
Figure 1 is a perspective view; figure 2 is plan view, and figure 3 is a vertical section, showing the interior. The same letters refer to like parts. A is the outside of the churn, which is made like a tube; B is the lid, it is made of two halves, which are secured together by hooks, to be easily taken apart. The lid sets snug on projecting pins in the upper edge or rim of the tube. It is required that the lid be solid and snug. A standard bearing is screwed to one half of the lid, to support a shaft with a bevel wheel, D, on it;—this bevel meshes into a bevel pinion, E, which is secured on the top of the dasher shaft, C. This dasher shaft has pins or arms, G G, secured on it; these are the agitators. This shaft has a journal at the foot, running in a metal step in the churn bottom. When the crank is turned, the large bevel wheel gives a great velocity to the pinion, consequently to the dasher. To the inside of the churn, there are secured projections or ribs, F F, these form the peculiar feature of the churn, and give a counter direction to the cream, when it is acted on by the revolving dashers, G G. Mr. Tillinghast, one of the inventors and proprietors, is now in this city, at Dunlap's Hotel, Fulton street, exhibiting the churn. On last Friday afternoon an experiment was made with it at our office, in the presence of quite a number of gentlemen; Mr. Tillinghast was the operator, and the experiment was conducted with good humor, and ended to the satisfaction of all present. Butter was produced in a little over ten minutes; and from the nature of New York cream, although we are opposed to betting, we undertook to wager a quarter of a peck of potatoes, that he would bring forth chalk instead of butter, but we were happily disappointed; a good lot of as beautiful butter as we ever saw, was produced in the time mentioned. This is a capital churn; it is simple (not an atmospheric one), and is easily operated. We cannot but recommend it as being simple, useful and durable.

IMPROVED LOCOMOTIVE BOILER.---Fig. 1.



This improvement on Boilers, is the invention of Mr. Samuel Bradly, Mauch Chunk, Pa., who has taken measures to secure a patent for the same. Figure 1 is a vertical longitudinal section, showing the interior; figure 2 is a transverse section. The same letters refer to like parts. The nature of the invention is the providing of tubes within the boiler, which form fire flues leading from the fire-box, curving upwards, but rising vertically for some distance above the crown plate. The main part of the tubes passes through the waist of the boiler, in a horizontal direction, and by the first part of the tubes being vertical, and then running through the boiler horizontally, a great length of tubular heating surface is obtained. A is the shell of the boiler; B is the fire-box, it is surrounded by water spaces which communicate with the body of the boiler; C is the smoke-box; D is the chimney or smoke-pipe; E E E are steam chambers on the top of the boiler, and are

FIG. 2.



united by the pipes, H H. F is the furnace door; G G G are the heating tubes—any number may be employed; they communicate with the fire and smoke-box, passing through the crown plate in front, and the inner rear plate behind. These tubes are curved at some distance above the crown plate, and then run horizontally to the smoke-box, as represented in fig. 1. The inventor proposes to employ about 75 tubes, of 2½ inches diameter, in a large locomotive. No further description of this boiler is required. The accompanying engravings convey a correct idea, at a glance, of it nature and construction.

More information may be obtained by letter addressed to the inventor.

Mosaic Gold.

Mosaic Gold, or Aurum Mosaicum, is used for inferior articles. It is prepared in the following manner: A pound of tin is melted in a crucible, and half a pound of purified quicksilver added to it; when this mixture is cold, it is reduced to powder, and ground with half a pound of sal ammoniac and seven ounces of flour of sulphur, till the whole is thoroughly mixed. They are then calcined in a matrass; and the sublimation of the other ingredients leaves the tin converted into the Aurum Mosaicum, which is found at the bottom of the glass, like a mass of bright flaky gold powder. Should any black or discolored particles appear, they must be removed. The sal ammoniac used here must be very white and clear, and the mercury quite pure and unadulterated. When a shade of deeper red is required, it can easily be obtained by grinding a small quantity of red lead along with the above materials.

Gold Powder.

Put some gold leaf, with a little honey or thick gum water, into an earthen morter, and pound the mixture till the gold is reduced to very small particles. Then wash out the honey or gum repeatedly with warm water, and the gold will be left behind in the state of powder; which, when dried, is fit for use.

Another, and perhaps better method of preparing gold powder is to heat a prepared amalgam of gold in a clean open crucible, containing a very strong heat, till all the mercury has evaporated, stirring the amalgam all the while with a glass rod. When the mercury has entirely left the gold, grind the remainder in a Wedgwood's mortar with a little water; and when dried it will be fit for use. The subliming the mercury is, however, a process injurious to the health.

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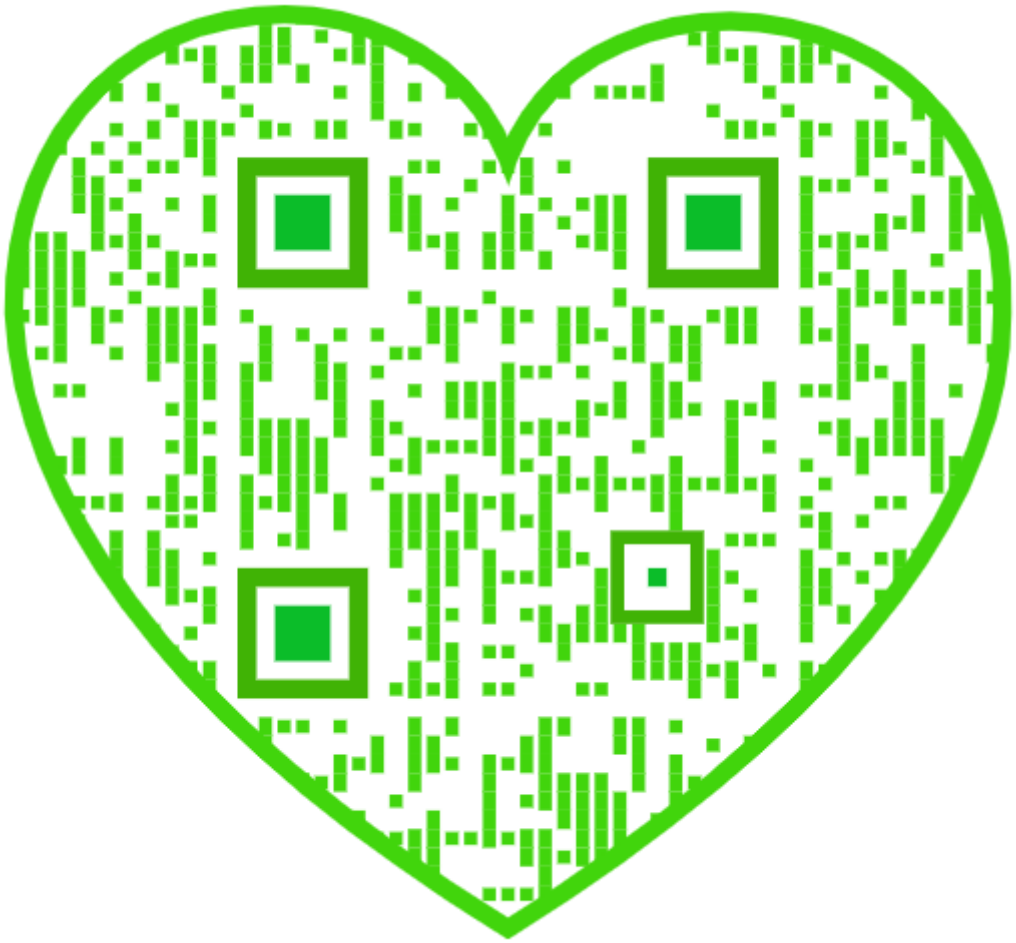

Miscellaneous.

Georgia Railroads.

La Grange, Nov. 23, 1850.

Messrs. Editors—The Railway system of Georgia is more comprehensive than that of any other State in the Union, and differs materially from that of the other States, in having not only its own lines, but their feeders from other States, concentrated within its own limits,—so near to the centre of population as to be accessible, within twenty-four hours' time, to near seventy thousand of its voters. Elsewhere, diverse and antagonistic interests have aimed at concentrating trade at different points; but here, by the policy of the Georgia Legislature, at a point nearly equidistant from the Atlantic, the Mexican Gulf, and the great Mississippi Valley, we have located the city of "Atlanta," from which point, as a common centre, the greatest Railway system of the world diverges. Four great lines radiate in the following directions: north, via Dalton, to Chattanooga and Nashville, Tenn.; also via Knoxville, Tenn., a line is under contract to Lynchburg, and Richmond, Va. East, via Augusta, to Charleston and Columbia, S. C.; also lines are under contract to Raleigh and Wilmington, N. C.—South, via Macon, to Savannah, and to the south-western counties of our State, a section unsurpassed in the exuberant fertility of its soil and its adaptation to the culture of long cottons and sugar cane. These lines are proposed to be extended—one to Pensacola and the other, via Columbus, to Mobile. Indeed, contracts are let on both roads. West, via La Grange, to Montgomery, Ala., which line is in process of extension to the Mississippi, at Vicksburg; also, via Rome or Chattanooga, to Memphis, Tenn., the construction of which line is now reduced to certainty. When this line is completed, one-third of the distance between the Atlantic and the Pacific, will be traversed by the locomotive. These lines combined, sum up a grand total of nearly three thousand miles, and a majority of them are in full and profitable operation, having been built and equipped in the short period of 13 years, and representing near fifty millions of dollars capital. Of the above lines, the following lie entirely within the State, and are exclusively owned here, with the exception of $250,000 of Macon and Western stock:—

Georgia Railroad and Banking Co., 210 miles long, capital $4,000,000, built in 9 years—12¼ per cent. net profit.

Central Railroad and Banking Co., 191 miles long, capital $4,000,000, built in 8 years—10 per cent. net profit.

State Railroad, 135 miles long, capital over $4,000,000, built in 12 years.

Macon and Western Railroad, 101 miles long, capital $750,000, built in 12 years—17 per cent. net profit.

South-western Railroad, 100 miles long, capital about $1,200,000.

Atlanta and La Grange Railroad, 87 miles long, capital $1,000,000, built in 3 years (estimated)—12½ per cent. net profit.

Augusta and Savannah Railroad, say 85 miles long, capital about $1,200,000, built in 18 months.

Hiwassu R.R., 25 miles long, capital $300,000.

Milledgeville and Gordon R. R., 20 miles long, capital $180,000.

Memphis Branch R. R., 18 miles long, capital $175,000, built in 2 years—9 per cent. net profit.

Columbus Railroad, 50 miles long, capital $1,000,000.

Total miles of Railroad, 1,022; capital, $17,805,000,—comprising eleven roads, besides some unimportant branches. In the above condensed statement there may be some inaccuracy, as I quote entirely from memory, but I am very nearly correct.

If suddenness of transit, quickness and cheapness of transport, facility of travel, and convenience of market, have any influence in building cities, then is Atlanta destined to become the Queen City of the South. The eye of the political economist can clearly detect, in the signs which surround her, the prestige of a proud destiny, of which only the folly of her sons can rob her.

Having daily communication with 8 degrees of latitude, and as many degrees of longitude, by means of railways which concentrate in her market, the fruits and breadstuffs of the Mississippi Valley, the minerals and ores—coal, iron, copper, silver, lead, gold, &c., of the mountainous region; the great staples, cotton, rice, tobacco, and sugar, of the low country,—she holds the central position, where the producers and consumers of these great staples can meet and exchange in her market, on the most advantageous terms,—for railway freights at the South are not subject to insurance, drayage, wharfage, pilotage, storage, commission, or loss of interest, by means of exchange. In these items lie the great want of railway success. The same enterprise which has advanced our railroad interests has been felt in other branches of industry: we have one hundred factories, such as cotton mills, iron-works, a variety of works for wooden ware, foundries, flouring mills, and machine shops. Education has more than kept pace with the progress of industry. There are five chartered colleges for the education of young ladies, and several standard institutions, privileged to grant academic honors to young men. The U. S. Marshal states that the population of our State will not fall short of a million of souls. The yield of our cotton, rice, and lumber, will not fall much short of forty millions of dollars:—a fair comparison with the whole export north of Mason and Dixon's line. Besides these staples, we have provisions and manufactured articles enough to support us. With regard to morals, there has never been a single white person hung west of Flint River, in Georgia; our jails are nearly all without occupants; there are very few (in some counties none) criminal prosecutions, and, for two years, I have known but one sale of property for debt. Indeed, we do not believe that the world can show another community of a million of souls, with an equal amount of moral, mental, and pecuniary elevation, as the people of the State of Georgia. It cannot be denied that Georgia "has borne her honors meekly," but we all look forward to the time when the "Youngest Sister of the old Thirteen" shall contest the title of the Empire State of the Union.

W. F. Fannin.

Paine's Light.

Gents.—"When an announcement is made in your journal of a *proposed* undertaking, or of a *suppositive* discovery, comments thereon, anonymous or otherwise, pro or con, are naturally looked for, and justly made. But when a party over his own proper signature, makes a positive statement, (without backing the same by demonstration,) that he has discovered some new law or property," that person is justly held responsible by every member of the commonwealth, and every reader of the Scientific American, as courting singular notoriety, or sporting with truth. In last week's Sci. Am., Mr. Paine publishes a letter in reply to one that I wrote the week previous. He consigns me to the shades, along with the Scientific Committee, for using an anonymous signature. I have nothing to do with Mr. Paine, personally; I have nothing to say to him as a man, for I do not know him intimately, but his statements are public property, and any man, under any signature, has a right to deal with them in a fair manner; I have no such penchant for notoriety, as to write my name, like him, under the full glare of his "electric light;" it was at his own suggestion that I adopted the signature I now use, and he is the last man in the world who should find fault with it. Mr. Paine holds that no man in the world, under an anonymous signature, has a right to deny a positive statement, made by another, about some grand discovery, like his light. Well, the Scientific Committee used no fictitious signatures, so it is very spleenish in friend Paine to consign the members of it to the shades. As for myself, I won't stay in the shades, Mr. Paine; I am too much of a Knickerbocker Yankee to go things blind—I won't take a man's word for making an assertion that he can convert a piece of chalk into cheese, just because he chooses to say so, and exhibits a cheesey-looking lump of something. No, no; I want to examine the professed chalk cheese, and not only the professed chalk cheese, but the manner of making it, to see if the process set forth by the discoverer really produces such wonderful results. The public feel just in this way about Mr. Paine's light—an intelligent American public will not submit to the *ipse dixit* of any man. Mr. Paine has not kept his word with the public—his promise has not been fulfilled, and until he fulfils it, he may consider himself consigned to the shades along with myself; so we will have a fine time of it. I have no doubt, however, of being able to get out, although I have strong doubts about him, unless he does as I do—namely, trust to good old

Carburetted Hydrogen.

New York, 7th Dec., 1850.

Causes of Idiocy.

The near relationship by the blood of the parents seems to be the cause of, or at least it is the precendent fact to, many cases of idiocy. We do not suppose that this connection is, of itself, the cause of idiocy. But if there are any weaknesses, or defects of body or mind, or tendencies to disease or oddities, in the family, they may be overpowered or cease to appear in the next generation, if those who have them marry with strangers, and mix their blood and life with those who have not these peculiarities; and thus the children may escape these imperfections or liabilities that otherwise might have been entailed upon them. But when two persons of the same blood and character unite together in marriage, their peculiarities are doubled in power by being combined in their children; and the odd or weak traits, which were subordinate in the parents, may predominate in the offspring. The parentage of 359 idiots was ascertained. In seventeen families the parents were near blood-relations. In one of these families there were 5 idiotic children born; in five, 4 each; in three, 3 each; in two, 2 each; and in six, 1 each. In these seventeen families 95 children were born; 44 idiots, 12 scrofulous and puny, 1 deaf, and 1 a dwarf, 48 in all of low health or imperfect, and only 47 of even tolerable health.—[Winslow's Psychological Journal.

New Telegraph Experiment.

The Buffalo Republican is responsible for the following:—This morning the operators on the O'Reilly Tellegraph line were unable to send messages, or communicate further west than Westfield. Beyond there, the wires would not distinctly operate. At length a person residing four miles west of Westfield, came into the village and informed the operator there, that he had been disturbed in his rest all night by the howling of dogs. On getting up in the morning he ascertained the cause. He found near his house two dogs tied to the telegraph wires, and they were performing sundry and divers capers, such as the canine race exhibit after having taken a good dose of *nux vomica*. Some wag had cut the wires and taken them out of several posts and tied a dog to each end by the tail, the electricity, at every manipulation of the operator, causing the dogs to howl out messages of war instead of love and business.

The Wine Culture in the West

A German agricultural periodical, published in Pittsburg, states that within a circle of 20 miles from Cincinnati, there are 734 acres of vineyards, planted with Catawba and Isabella grape; the imported vines have not succeeded, excepting in more southerly districts. In 1848 the average produce was 300 gallons per acre; in 1849, the most unfavorable year hitherto, 100 gallons per acre. New Catawba wine is worth 75 cents, and after fining, &c., readily fetches $1,25 per gallon.

A house in Manchester, England, is preparing for the Great Industrial Exhibition of London, a fabric which is to be spun from a pound of cotton, and to extend in length two hundred and thirty-eight miles, and eleven hundred and twenty yards. There are eighty layers, of a yard and a half each, in the warp, with seven warps to the hank, and five hundred hanks in the pound of cotton.

Mechanics' Institute of New York.

This Institution, we are glad to learn, is advancing in prosperity and character. It is intended to hold a Fair next year, in this city, for the purpose of a Mechanical Exhibition exclusively. A large circular building, 200 feet in diameter, is to be erected with galleries running around inside. We have seen drawings of the building to be erected, and have been impressed favorably with the whole design, and the manner in which the Fair is to be conducted. The drawings were presented to the Institute by John T. Fisher, Esq., Chairman of the Committee on Fairs and Exhibitions. The floor outside circle is to be divided into shops for the display of different kinds of machines in operation, and various trades. The second concentric circle is to be devoted to the display of all kinds of manufactured articles and works of art. The Committee Rooms are to be in the very centre, with passages leading up to the gallery. The building is to be temporary, and will be erected in some convenient part of the city. It will be managed with ability, and will no doubt bring visitors from a great distance. The President will visit the World's Fair, and the Fair of the Institute will be held after that, during the first or second month of autumn. We wish it all success.

Drinking During the Holydays.

The National Temperance Society has sent us a circular, requesting us to say a few words, especially to young people, about drinking intoxicating liquors during the Holidays. A tract on the subject, by Charles Hoover, Esq., editor of the New York Organ, accompanies the Circular. The Circular is signed by John Falconer, Prest. Mr. Falconer is one of our wealthy merchants, who employs his money as a good steward, in doing good. He is a man of active benevolence, and does a great deal of good. There is one custom, in our home mercantile trade, which is a very bad one; we allude to the custom of some merchants having clerks, who are compelled to board at public hotels, to grab country merchants for customers, by treating them and attending them to public places of amusement and resort. This custom should be abandoned. The custom of drinking at Christmas and New Year is very pernicious, and should be broken up. Every lover of his fellow man must be pained to witness so many persons, and especially young men, reeling drunk in our streets, on New Year's Day.

Late News from California.

By the arrival of the Georgia and Empire City steamships from Chagres, we learn that the cholera had broken out at San Francisco. The steamboat Sagamore burst her boiler at San Francisco, by which accident 14 persons were known to have lost their lives. The Empire City brought $2,000,000 in gold dust. On the 29th Oct. there was a grand rejoicing about the admission of California into the Union.

Silver Mine in Vermont.

A bed of silver and copper ore has been discovered about three miles southeast of the village of Brandon, Vt. The ore is incorporated with milk quartz and argillaceous slate. An average specimen analyzed by W. H. Sheppard, mineralogist, gave 31·13 per centum pure silver, and 17·09 of copper.

Bituminous Coal.

An extensive bed of this mineral has been discovered in Chatham County, North Carolina, on the Cape Fear river, which is navigable for vessels of from 150 to 200 tons burthen, to within thirty or forty miles of the coal bed, where navigation is interrupted by rapids. The coal is said to burn freely, and to be entirely free from sulphur; and the company anticipate handsome profits from their enterprise.

Remedy for Horse Hoof Bound.

Mix equal parts of tar and some soft grease, having the foot clean and dry; apply it hot, but not boiling, to all parts, letting it run under the shoe as much as possible. In bad cases, the application should be made every day for a week, and then two or three times a week, til the foot becomes strong and smooth.

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For the Scientific American.

The Voltaic Battery.---Electrotype.

NUMBER VII.—(CONTINUED.)

The adhesion of the deposit to the metallic basis, or mould, cannot be said to be an anomaly in the deposition of the metals by the voltaic current, for it is on this very property that the plating art is based. But why the opposite conditions of those which produce adhesion in plating, are not always effective in producing non-adhesion, is not known; but it is now well established that a mere film of heterogeneous matter between the mould and deposit cannot be relied on to prevent adhesion.

The most simple of all the methods proposed for preventing adhesion by the interposition of a heterogeneous film consists in taking advantage of the film of air, which adheres so firmly to polished metals, as to prevent them from being wetted for some time after first immersing in water. To gain this film of air on the plate to be electrotyped, after making all attachments to the plate for connecting it to the battery, it is to be placed for several days in a cold cellar; after this the plate is to be attached to the battery and immersed in the bath; taking care not to touch the plate with the fingers, and making sure that the act of immersion completes all the arrangements, and leaves no time for the solution to attack the plate. The surface of the electrotype made by this method, when examined with a magnifier, appears undulated, which shows that the air film was waved while being covered with the copper.

Another method is to heat the plate to the temperature of boiling water, and then to smear it with olive oil; every particle of the oil is then to be wiped off by a crumb of fresh bread, and a piece of beeswax is then held to the edges of the hot plate; the melted wax instantly flashes over the plate, giving it a a thin and pretty uniform coating, if the operation has been dexterously performed. Any excess of wax is to be wiped away with a fine linen cloth. After the plate has been cold for a few hours it may be put into the precipitating bath; and here again we must make sure that the immersion completes the voltaic arrangements. This method of preparing the plate is not so liable to fail as by the film of air, but the operation is tedious, for, with the utmost care, some of the finer lines will be choked up; and after we have done our best in preparing it, after immersing it in the bath for the battery action, perhaps we shall never see its face again.

It has been proposed to silver the plate to prevent adhesion, it having been observed that the liability to adhesion was less when a dissimilar metal intervened between the plate, from which it was inferred that the attraction of copper for silver was less than the attraction of copper for copper. This inference is, however, erroneous, for copper can be precipitated on a plate of silver, so firm that the chisel cannot separate it. But when a piece of copper is silvered by chemical affinity, the substance holding the silver in solution, forms a compound with the copper, and on this the silver is deposited. This was explained as a cause of non-adhesion in the number on Plating. Not much reliance can be placed on this method.

There is yet one more mode of preventing the adhesion, which is altogether based on different principles from those described above. This method has been applied a great many times to very large and costly plates, and has not once failed. The operation is performed in a minute, and there is nothing to choke up the fine lines. This process will soon be patented, and therefore a description of it in this place would be improper.

The solution to be used in electrotyping is made of six pounds of water, one pound of sulphate of copper, and six ounces of sulphuric acid.

Evening Lectures.

New York City is at present deluged with lectures, many of which are the rankest trash in the world. There is but a very small amount of philosophic taste in our city in proportion to the population.

Building for the World's Industrial Exhibition.

This building is altogether a most stupendous affair. The architect and designer of the fabric, is a Mr. Paxton, whose plan differs from that originally proposed by the Committee, and gets rid of the fifteen millions of bricks and the immense and impracticable sheet-iron dome contemplated by the latter. Iron, glass, and lumber are his materials, which are prepared in different parts of the kingdom; and the contractors, Messrs. Fox, Henderson & Co., have engaged to put them together and cover the whole edifice in by the 1st of January next.

"The building will be 1,848 feet long, by 408 feet broad and 66 feet high. The long line is crossed by a transept 108 feet high, which will inclose a row of elm trees, now standing at a point so near the centre as to divide the length into 948 feet on one side and 900 feet on the other. In addition to the timber for joists, flooring, &c., the glass and supports of iron comprise the entire structure. The columns are similar in form throughout. The same may be said of each of the sash-bars and of each pane of glass. The number of columns, varying in length from 14 feet 6 inches to 20 feet, is 3,230. There are 2,244 cast-iron girders for supporting galleries and roofs, besides 1,128 intermediate bearers or binders, 358 wrought-iron trusses for supporting the roof, 34 miles of gutters for carrying water to the columns, 202 miles of sash-bars, and 800,000 superficial feet of glass. The building will stand on about 18 acres of ground, giving, with the galleries, an exhibition surface of 21 acres; but provision will be made for a large increase of galleries, if necessary. The gallery will be 24 feet wide, and will extend nearly a mile. The length of tables or table space, for exhibiting, will be about 8 miles. An idea may be formed of the unprecedented quantity of materials that will be employed in this edifice, from the fact that the glass alone will weigh upwards of four hundred tons. The total cubic contents of the building will be 33,000,000 feet. The total amount of contract for use, waste, and maintenance, is £79,800; or very little more than nine-sixteenths of a penny per cubic foot. The total value of the building, were it to be permanently retained, would be 150,000*l.*; or rather less than one penny and one-twelfth of a penny per cubic foot."

Special precautions have been taken by the architect to provide for the complete ventilation and drainage of the vast pile. To effect the latter purpose, the glass roof is so contrived as to consist of a series of 'ridges and valleys' exactly eighty feet wide. Along the sloping sides, without and within, the water is conducted into gutters at the head of each column, whence it escapes through the columns themselves. In no instance has the water further than twelve feet to run before it is delivered into the valleys.

For the purpose of ventilation, the whole building, Mr. Paxton says, will be fitted with louvre, or luffer, boards, so placed as to admit air but exclude rain. In the transept alone there will be 5,000 superficial feet of ventilators provided. It is intended to cover the roof and south side of the building with canvass, which will substitute a gentle light for glaring sunshine; and, in very hot weather, says the Athenæum, it may be watered and the interior kept cool.

By late news, the building was proceeding rapidly. Nearly the whole of the columns in the transept have now been fixed, and considerable progress has been made in the glazing of the roof of the first and second stories of the building, upwards of twenty thousand square feet having been completed. The glass, which is of the weight of sixteen ounces to the square foot, is four feet in length, ten inches in width, and one-eighth of an inch in thickness. The glass is brought to the ground in boxes, each one containing fifty sheets. A machine is used for cutting the sash bars and their ends of the exact length and angle required. The sash bars—of which it may be remembered 202 miles in length are required—are four feet one inch in length, and as they are intended to be placed in what is termed "ridge and valley" style, it is necessary that their ends should be cut to exactly the same angle. The enormous amount of time which would be occupied in thus cutting by hand 266,000 distinct sash bars—for such is the number required—has led the contractors to the construction of this machine, with which, by a very simple process, the object is completely attained. A large number of the sash bars are placed securely upon a frame set in motion by a steam-engine, and the ends of the sash bars, which project over either side of this frame, are brought into contact with circular saws, also worked by steam, and placed on either side of the stage upon which the frame traverses. Upon one side the saw is placed obliquely, and, in revolving, cuts the ends of the sash bars at precisely the angle required; while upon the other side two circular saws, one being of less dimensions than the other, cut the bars to the exact length, and their ends to the form required. About fifty sash bars can thus be sawed accurate and completely within the minute.

The painting of such a vast quantity of sash bars has also been provided for by means of a "painting machine." This machine contains a well, rather longer than the sash bars, about one foot in depth and the same in width into which the paint is poured. Some thirty or forty of the "sash bars" are then thrown into the well and covered with the paint. One of the bars is then taken from the well, and passed through a small frame, the interior of which is fitted, on each side and at the top and bottom, with brushes, upon a plan similar to that adopted in the "knife-cleaning machines." The superfluous paint is taken off the bar in its passage through the machine, by coming in contact with the brushes, which are made coarser towards the point of entrance, and gradually increase in fineness to the point from which the bar is removed; the paint which is brushed off drains into the well. Every part of the bar is well covered by this process, and it presents none of that irregular appearance which is to be seen in cases where the material is painted by hand. Each of the sashes are to receive three coats of paint, the last of which will be white.

There is also a machine on the ground for filling with putty the grooves into which the glass will slide. A number of "glazing carriages," constructed to run along the "Paxton gutters," and under the roof, afford the glaziers an opportunity of proceeding with their work in wet weather. Two or three hundred carpenters are employed under those portions of the roof which are glazed, in the preparation of the wood for the external facing of the ground story, of which about 300 feet has been completed.

Almost every process connected with the erection of the building is now going on in different parts simultaneously. Foundations are being dug in one part, columns and girders raised in another; here the frame-work of the flooring is being laid, and there the roof is being glazed; carpenters are "guttering" and sash making; smiths, fitters, and rivetters are employed in putting together the trusses and girders; painters are painting the columns and frame-work of the building; bricklayers forming the drains and branch sewers; in a word, there are workmen of almost every trade, upwards of a thousand in number, each with the most perfect order and regularity, doing his part towards the erection and completion of this truly wonderful building.

Change in Relation to Procuring English Patents.

"The Attorney General, with the assent and concurrence of the Solicitor General, hereby gives notice, that every person applying for a patent after the second day of November, 1850, will be required to deposit in the office of the Attorney or Solicitor General, an outline description, in writing or drawing, to be approved by the Attorney General or the Solicitor General, before any report will be made on such patent."

The effect of this order will be to prevent a large amount of that fraud which not unfrequently took place under the recent system, in consequence of the applicants describing to the Attorney General or Solicitor General, inventions differing from those which they afterwards specified. The prospect of being able to glean from the articles exhibited in the great exhibition a great variety of novelties might have induced many persons to make applications for patents with tales studiously vague, and as they could not be compelled to complete their specification within six months, or even within a much longer period, they would have the opportunity of including within it any inventions or improvements which they might see, and which could by possibility be included under the title which they have given to their inventions.

As a consequence of this, the ingenious and confiding inventor and exhibitor would have probably found, when too late, that the results of his labors, and his expenditure of time and money, had been included in another person's patent, and probably the first notice which he would have received of this act of approbation would have been an injunction to prevent him from proceeding either with the manufacture or sale of his invention. By compelling applicants, however, to deposit an outline description in writing or drawing, to be approved by the Attorney General or Solicitor General, this monstrous fraud will be prevented, and the rights of the exhibitors, so far as priority of invention is concerned, to a certain extent secured. The British Government must come marching up the hill to the plan pursued in America for securing patents, which with some little alterations, is the best of all—nearly equal to that of France.

Report on Wilder's Lee-way Indicator.

WASHINGTON, Dec. 3, 1850.

HON. THOMAS CORWIN, Sec'y of the Treasury,

SIR—The undersigned, at your request, have examined the operation of the instrument invented by Mr. Wilder, called the Lee-way Indicator, and respectfully report as follows:—They studied the action of the instrument while it was attached to a sail-boat, on the Potomac; the boat was furnished with a movable centre-board, by means of which the amount of lee-way could be increased or diminished at pleasure. The vessel moved with a uniform velocity under the action of a strong wind. In all cases of observation the instrument acted promptly, and indicated each change in the position of the centre-board, the index returning to the same degree when the board was restored to its first position. From the trial it is evident to us that the indications of the instrument are little affected by friction, and from the simple mechanical principle on which it acts, we have little doubt that it will indicate the true course of a ship, and thus furnish the means of determining the lateral motion. We do not apprehend that any different result would be produced if it was attached to a larger vessel, though it is not impossible that difficulties would be found of a practical nature, which do not occur to the undersigned. With much respect we have the honor to be, your obedient servants,

JOSEPH HENRY,
Prof. Smithsonian Institute.
JOS. SAXTON,
Machinist of the Coast Survey.

[In connection with the above, we would state that we have seen a letter from Lieut. M. F. Maury, of the National Observatory, to Com. Skinner, Chief of Bureaux, wherein he says, that under-currents, friction, &c., do not appear to him insuperable difficulties to the correct action of Mr. Wilder's Indicator. This is high, authority. the only supposed obstacle being under-currents. Com. Skinner, reporting to the Navy Department, states that the instrument would be useful in running along coasts and in foggy weather. Commodore Morris, in reporting to the Secretary of the Treasury, says that he believes "it will accomplish all that is claimed for it." These are important opinions about this invention.

Copper when reduced to hydrogen at a heat below that of redness, on exposure to the air becomes converted throughout into a mass of protoxide, and it then produces flame when pounded for some time with sulphur in a mortar.

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New Inventions.

New Heddle Machine.

During the past week, Messrs. W. R. & G. W. Harris, of Middlebury, Vt., have been exhibiting a machine for making knotted weavers harness, at the Commercial Exchange, Courtland street, this city. The machine is the joint invention of Mr. W. R. Harris, & Simeon Houghton Jr., of Middlebury, Vt., and was secured to them by patent a few months ago. The machine, by cams on the main shaft, gives a double motion to two shuttles, which move back and forth on the machine, forming square knots and good eyes without any twist. The cord is supplied by two spool frames, one at each end, and with the cord moved by the shuttle, the knots and eyes are formed. There are shippers and arms which move the cord from the spools, so as to form the cross and allow the shuttle to pass through to form the knot, and besides this, there is a motion to draw up the knot. There is also a stop motion for the shuttle, so as to throw the machine out of gear when the shuttle is caught. It is allowed to make better harness than by hand, owing to the absence of all twist in the same. One girl can attend three machines, and each one can make, it is stated, six times the amount a girl can do by hand in the same time. It is not possible to give a good description of its motions, without drawings, but it will be exhibited by Mr. G. W. Harris for a few weeks at the place mentioned above, where it may be seen. It is a strong machine, and may be constructed, we believe, to work accurately and well.

Improved Side Light for Ships.

Mr. L. Goodrich, of this city, has invented and taken measures to secure a patent for a very valuable improvement in side windows for ships, which must soon come into general use, and supplant those at present employed for that purpose. The common ship windows are made of round thick glass lights, fastened in iron frames, which are secured by strong hinges to fit into openings, and are clasped or keyed inside, to fit them for sea, but in port they are thrown open, outwards, on their hinges. The improvement consists in fitting the light to screw into the ship's sides, into a screw socket, and yet attached by hinges to allow the window to be thrown open, like those in common use. The window couples like a butt of hose, but the joints are slotted so as to allow the light to be screwed into, and unscrewed from, its socket. This window can be closed and unclosed far easier than the kind now used, and there is no possibility of its getting loose at sea—it is entirely safe in that respect. We will soon publish an engraving of this invention.

Improvement in Bleaching Ivory.

Mr. Ulysses Pratt, of Deep River, Conn., has invented and taken measures to secure a patent for an improved frame for bleaching ivory for pianoforte keys, &c., which will greatly facilitate the process, and produce better work. The bleaching of ivory is done by solar influence, viz., wetting the ivory and exposing it to the influence of the sun, under a sky-light; the pieces of ivory are laid upon a frame, or frames; and to bleach them right, the frame should be so made that each piece can be set and exposed to the light at any angle, to present the edge end, or portion of the surface only. No good frame has ever been used to accomplish these purposes. Mr. Pratt's frame is adapted to accomplish them all, and also to raise and lower the frame at any angle, near to, or at a greater distance from, the sky-light.

Red-Hot Roller.

It is said that Hartwig Von Blucher, a German naturalist, has introduced a heated roller into Silesia, which being passed over the land, burns the wood, and furnishes, in the ashes, an excellent manure.—[Exchange.

[How can it burn them without being red hot and how is it to be kept red hot? The cheapest way is to cut the weeds, when dry, set fire to them, and let them burn themselves. Hartwig Von Blucher may be a very good naturalist, but a very expensive farmer.

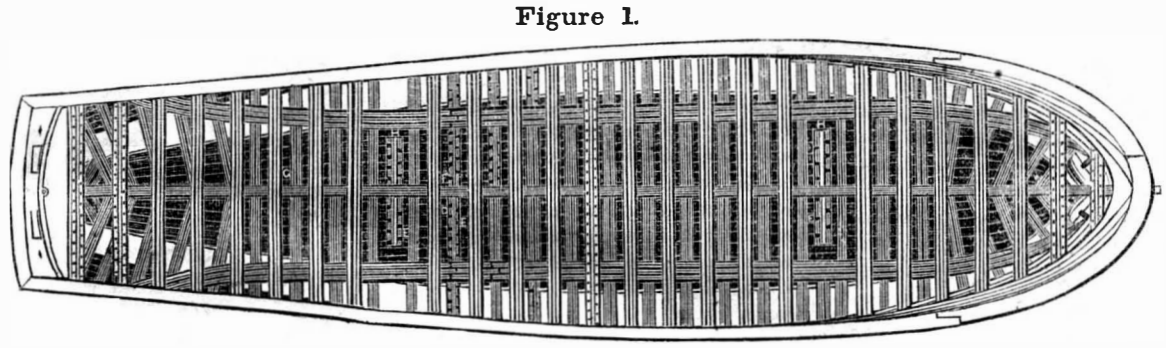
LOPER'S PATENT METHOD OF CONSTRUCTING SHIPS OF METAL AND WOOD.

In No. 7, this Volume, Scientific American, we copied an article from a Liverpool paper, in which it was stated that a Mr. Jordan, of that place, had made an important improvement in the construction of ships, by substituting iron for wooden framing. We stated at the time that the invention was not new, that it rightly belonged to America, and that Capt. Loper, of Philadelphia, had applied it to vessels some years ago. We will now prove the verity of what we then asserted.

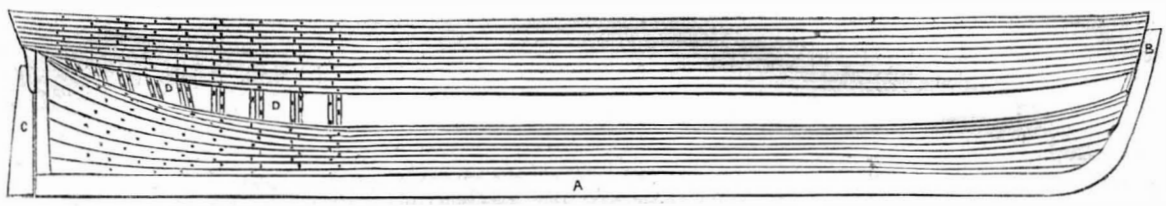
The accompanying engravings are various views of Capt. Loper's invention, patented by him in November, 1847. Fig. 1 is a plan view; fig. 2 is a side elevation; fig. 3 is a cross vertical section. The other figures will be referred to in the description. The same letters refer to like parts. The nature of the invention consists in constructing the framing of ships, and other vessels, of bars of plate metal, connected together by bolting to them the wooden ceiling, the keel, and stern and stern-posts, to make a vessel of greater strength, with a given weight, than can be attained by means of wood alone, and prevent the corrosion which takes place when the outside of a vessel is made of iron.

A is the keel; B is the stem, or bow; C is the stern-post, made in the usual way. To the inner surface of these, there is bolted a plate of metal, seen running all the length, like a brace, in the middle of fig. 1, from stem to stern. This plate is rolled with a bead in the

Figure 1.

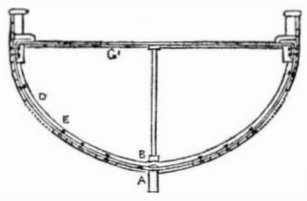


2



middle of its width. The ribs, D, are made of bars of plate metal, rolled with a raised bead or arch on one side, and a recess on the other, and extending the whole length. This is represented on a large scale in figures 4 and 5, E being the bead. These ribs are bent in the form of the cross section of the vessel, and provided with a row of holes on each side of the bead, through which the bolts, F, pass, to secure them to the keel. The beads of the bolts, which are outside, are let into the wood a sufficient distance to admit of driving in a wooden plug, I, along with cement, to prevent the access of water to the bolt-beads, as represented in fig. 5. The ceiling is secured to these metal ribs by means of screw bolts, in

Fig. 3.

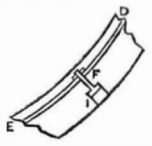


the same way as the keel; the bolt-heads being in like manner protected from the water.

When the frame is thus secured and bound by the ceiling, the outside planks can be laid on in the usual way. The attachment of the wood to the iron ribs, by screw bolts, will make liquid proof joints, and the channels formed by the bead and the wood attached thereto, can be filled with oil to protect the metal from corrosion. Paint may also be used as a further protection to the joint. To secure the deck beam, G, the rib bars are bent to the proper angle, and the beams whether of wood or metal, are bolted to them. The bead rolled in the ribs may be of any desired form, but the semi-circular one in the cross section is preferred. The ribs may be made to extend, in a single piece, from gunwale to gunwale, or in two parts, with a lap-joint secured to the keel and the kelson. To give greater strength to the frame, intermediate short ribs, H, may be secured to the keel and kelson, and placed between the main ribs, extending up high enough to give the requisite strength to the

Fig. 4.

Fig. 5.

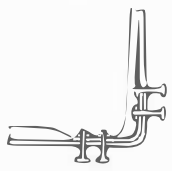


bottom of the vessel. Instead of deck timbers secured to the bent ends of the ribs, as stated above, Mr. Loper proposes to substitute bars, prepared like the ribs, and connected with lap-joints, as represented in figure 6,—the deck boards are to be secured to these bars in the same manner as the ceiling is to the ribs.

The claim of this invention is for "the constructing of ships and other vessels, with hollow iron ribs, and bound together by wooden planking and ceiling, as described, whereby a great saving in weight and cost of metal is effected, and the hollow ribs allow oil or lubricating substances to be introduced, and which, by the motion of the vessel is made to circulate and penetrate to the bolts and fastenings, thus preserving the wood, and preventing the metal from oxidation.

The above is from the specification, nearly in the same language, and the drawings are reduced to two-thirds of the original views. The importance of this invention cannot be over-estimated. The inventor is Capt. Richard

Fig. 6.



F. Loper, of Philadelphia, the well-known inventor of the Propeller which bears his name, and the designer of the greatest number of American ocean steam propellers now afloat. This invention will, we trust, as it should, receive general attention.

A New remedy for Short-Sightedness.

A few months ago, says Dr. Turnbull, I observed that persons who are short-sighted, when looking at objects at a distance, partially close their eyelids, for the purpose of overcoming the difficulty they find in discerning them. This action is instinctive; it is a natural effort to adjust the eye to an increased sphere of vision. It is known that short-sightedness depends not only on convexity of the cornea, but also on convexity of the lens; and having no hope of being enable to effect any alteration in the structure of the lens, my attention was directed to the iris, which I found to be, in such persons, generally much dilated. It then occurred to me that contraction of the iris has the effect of apparently lengthening the convexity of the cornea, which approaches a circumscribed plane, that permits the rays of light to enter only in a straight line. The effect of this is obvious. The length of vision hereby necessarily becomes increased, and distant objects are brought within its range. It therefore struck me, that if we could discover any substance which could be so applied as to contract the iris, one cause of the effect of short-sightedness would be remedied. The result, I am happy to say, has been most satisfactory. In the first instance, I applied the extract of ginger, which was rubbed for five or ten times over the whole forehead, with the view of acting upon the fifth pair of nerves. Afterwards I substituted a concentrated tincture, of the strength of one part of ginger to two parts of spirits of wine, decolorised by animal charcoal. The success of this application was remarkable. In many cases it had the effect of doubling the vision. In some persons I found the iris was not much dilated, but very torpid. In these cases I applied the concentrated tincture of pepper, made of the same strength and in the same manner, as the tincture of ginger. This I used until I observed that the iris had obtained a greater power of contraction and dilation, after which I had again recourse to the tincture of ginger. This plan of treatment has been attended with the most signal success, and persons who were extremely short-sighted have very soon been enabled to lay permanently aside their concave glasses. The best method, I may observe, of testing the improvement of the sight during this treatment is not by taking a printed book, and holding it near, and then at a greater distance from the eyes; the range of vision is much too limited. It is better to fix the attention of the patient upon a distant object, such as the brass key-hole of a door; and by stepping some paces backwards, so as to place himself at a greater distance from it, he will soon discover the progress he is making. So important a discovery as this will, I hope, be fairly tested by the members of our profession, who may rely on the success of the treatment I have recommended, if it be only judiciously and carefully carried out. It is impossible that the advantage derived from the tincture, as above described, may be ascribed to the alkaloid principle of peperin which is held in solution in the tincture of pepper.

[Our doctors should give this alleged discovery their attention.

An excellent "round splint match machine" is in operation in Commercial street, Boston; Messrs. Byam, Bruce & Fessenden, of Union street, Boston, have a very perfect one.

Mr. Wilder's Lee Way Indicator was illustrated and described, in No. 9, this Vol., Sci. Am.

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Scientific American

NEW YORK, DECEMBER 14, 1850.

Production of Cotton.

There is no article of agricultural produce, which engages so much attention, at present, as cotton; and no wonder. The magnitude of the cotton trade, so far as a relationship with manufactures is concerned, dwarfs every other. The stock, and production of American cotton, for five years, from January, 1845, was 14,150,000 bales. The stock consumed in that period was 14,812,000 bales, thus showing that the consumption was greater than the supply. A recent number of the Alabama Planter contains a circular, by Mr. G. G. Henry, factor, wherein it is stated, that although the cotton crop of 1849–50 was below that of 1848, yet it sold for $30,000,000 more. Does not this show the magnitude of the cotton trade? He states that if the consumption of cotton goes on for the next five years in proportion as it has done for the past, there would be a deficit of supply amounting to 2,300,000 bales. The consumption in America will not be as great this year as last, by one-third the number of bales, at least; but, then, what signifies our consumption in comparison with that of Great Britain? We run over 2,000,000 spindles, England more than 17,000,000; and she paid $71,440,975 for the raw material, last year.

It is long since the manufacturers of Great Britain began to try and rid themselves of dependence on America for a supply of cotton; but, as yet, they have not been able to do so successfully. At present there is more excitement than there ever was before, in respect to seeking other sources of supply; and they have turned their eyes towards the West Indies. A report has been published, of a meeting held in the Jamaica Bank, Kingston, where the question of the profitable culture of Jamaica cotton was discussed, and from the tone of it, we are confident that cotton cannot be cultivated profitably in Jamaica. The planters cannot get laborers to cultivate the crop, as one reason, and another is, it requires more cultivation to keep down the weeds than it does in any of our States.

For a long time great efforts have been made by the East India Company to cultivate cotton in that fertile region. American cotton agriculturists and American machinery were taken out there at great expense, and for many years, effort after effort has been made to increase the supply and improve the quality of Indian cotton, so as to compete with that of the United States; but all has been in vain. At a recent meeting of the Manchester Chamber of Commerce, the chairman, Mr. Thomas Bazley, stated that they were paralyzed for the want of cotton—that they were dependent upon one source, America, and that they were incurring a cost of ten millions sterling more, at the present time, than they should pay for the raw material, and he advised the meeting to look to the East Indies for supplying their future wants. Before India can raise cotton to supply England, the cotton lords of Manchester and Glasgow have a work to perform almost equal to transporting the Himmalaya mountains in ship-loads to the Mersey. The whole polity of the country, in taxes, customs, building of docks, deepening rivers, making railroads, and making the natives honest traders into the bargain, have all to be accomplished before the East Indies can be rendered a cotton producing country, to compete with America; and, during the time this reform is working out, will America be standing still? No: she will be shooting still further ahead. The article on Georgia Railroads, on another page, will show what energy and enterprise is now displayed by the cotton growing States, in the way of internal improvements, the developement of their natural resources, to facilitate transit, and thereby encourage the cultivation of cotton up in the interior, where, without railroads, the culture of it would be unprofitable. It is our opinion that our cotton cultivators have but precious little to fear from the East Indies. The native dealers of cotton, in India, are such scoundrels that they cannot be trusted in the least. It is not long since that 8,500 bags were seized because adulterated with foreign matter, and the parties who were guilty, confessed that the crime, although penal, was a regular, long-continued system. The British merchants will never be able to make much out of such men until they become christianized.

The only apparently reasonable offset to decrease the consumption of cotton, is the manufacture of more linen. If flax could be cultivated, and as easily manufactured as cotton, then it would supersede it, in a great measure; but it never can be: the separation of the woody from the fibrous parts of flax will always be an expensive operation. The cotton culture has nothing to fear from the linen, nothing. The linen trade was the great trade seventy years ago; America had not then exported her first cotton bale. The increase of the cotton trade has been a natural result, it has overshadowed the linen in importance, and we cannot divine a reason why it should not, and must still continue to be the great staple production for manufacturing purposes.

Agricultural Chemistry.

Plants contain various chemical substances. By burning a plant we find in the residue an ash, which contains a certain class of plant constituents—while another class escapes in the form of gas. The first is the mineral constituent, the second the organic; the latter contains only four substances, viz., carbon, hydrogen, nitrogen, and oxygen. The former is more extensive, containing sulphur, phosphoric acids, alum, magnesia, potash, and soda. Without these substances the plant could not flourish, and just in proportion as they are applied, so is the plant luxuriant. The inorganic constituents can have but one source, and that source the soil in which the plant grows. It is different, however, with the organic constituents, which have two sources drawn from the surrounding atmosphere. The atmosphere is the great reservoir of the organic constituents of plants. Two of them, nitrogen and oxgygen, exist in large, while the others, carbon and hydrogen, exist in small proportions. It must be understood, however, that all soils also contain a certain quantity of organic matter, which contain the same constituents, and are in many instances very important sources of those substances which form the food of plants. It is not enough that these substances should be in the soil; it is necessary that they should be in a state available to the growth of the plant, viz., in a soluble condition. The necessary constituents become soluble very slowly, and just in sufficient quantity to support that degree of vegetation which the economy of nature requires. Manure should contain all the substances in the exact proportion required by the plant, so that no waste might occur. It has, as yet, been impossible to carry out, practically, what is true theoretically. Theory and experiment have shown that the whole constituents of manure are not equally important. Nitrogen has been found to be the most important constituent of manure, because it is not so plenty as the others. It is true that the atmosphere contains great quantities of nitrogen, but then the plant also requires it most. In 100 lbs. of atmosphere there are 77 lbs., of nitrogen, but not more than $\frac{1}{4}$ of ammonia—hence the great source of ammonia, the right food for the plant, is the decomposition of animal and vegetable substances. In the management of the farm-yard, there should be two objects kept in view, to wit, the produce of the greatest amount of nitrogen, and the conversion of it into ammonia. The principal source of the two important constituents of plants comes from plants themselves, and that which is obtained from animals, comes from the plants on which the animals have been fed. It is a very important matter to keep manure free from air and moisture. The manure heap of every barn-yard should be covered by a roof.

To produce ammonia quickly, the manure should be heaped up, while it is produced more slowly when the fresh manure is plowed in the soil. By a knowledge of this, farmers can make their manure act fast or slow, as they choose. Every farmer should depend on his own barn-yard for his fertilizers, and to produce these in the greatest abundance, and at the least expense, should engage his attention. The production of ammonia, as shown, is the grand obje and this is formed by heaping up and fermenting animal and vegetable substances. To preserve the manure under roof is to save what has been already formed, and it is far cheaper to do this by covering in, than using gypsum without covering in. The reason why open barn-yards are common, is owing to the expense of covering them in; and another fact, in connection with this, is the want of a true knowledge respecting the value and the nature of the manure. As nitrogen is the prime plant-constituent to be provided artificially, and as ammonia must be served up as the food of the plant, and as this is very volatile—a test for showing what farmer is more enlightened than another, is his barn-yard.

In the last number of the "Rural New Yorker" there is an article entitled "Shade as a Manure," wherein it is stated that a correspondent of the "Plow, Loom, and Anvil" has advanced a new theory, that "the excrements of animals is not manure; that the residue of putrefaction is the aliment of plants." Neither Mr. Skinner nor Mr. Moore, we believe, entertain any idea of the novelty of this doctrine. It is wrong, in one sense, and right in another, as every man who has studied agricultural chemistry knows. The great difficulty, with some, in studying cause and effect, is, they don't dig deep enough. By what we have set forth above, it will be seen that the residue of this putrefaction is ammonia. Putrefaction is only the common name for the chemical fermentation. It is all nonsense to say that shade is a fertilizer, as has been set forth. Soil may be shaded for twenty years, and not become any more fertile, if there is not some means provided for the production of ammonia, and its absorption in the soil. The summer fallowing of land tends to the production of this food for plants, by the soil absorption of nitrogen, and the decomposition of vegetable or animal products.

War about Geometry.

Mr. Seba Smith, of this city, has recently written a new work on Geometry, termed "New Elements in Geometry." The nature of what is held forth to be new is, that all measurements in geometry are made of cubes. Here is some of it:—

"She never attempts to measure *something* with *nothing*, whatever vain imaginations have been indulged hitherto by her votaries. Her magic wand, by which she performs so many wonderful works, is not an ideal line without breadth, but a *positive magnitude;* by which I mean a magnitude having extension in every direction from its centre. That magnitude is always a simple *cube*, and nothing else. The cube is her *unit*, and she uses but one unit in all her measurements. If you ask her to measure simply a line or length, say the length of your parlor, she will inquire by what standard it shall be measured, or what shall be the unit? If you tell her a *foot*, she takes her *cubic* foot in her hand, and applies its length, or linear edge, along the distance required, and tells you how many times the length of her unit must be repeated to make the length of your parlor. Again; if you ask her to measure extension in two directions, length and breadth, say the area of your parlor floor, and to return the account in feet, she takes her unit, the *cubic* foot, and applies its length and breadth, or *one face*, a sufficient number of times to cover the floor, and tells you how many square feet it contains. If you ask her how much space or extension there is in the whole room, she then applies the *whole* unit, and fills up the room with cubic feet, and tells you how many it holds. And thus she measures everything, always with that simple square block."

This book has caused a flare up among some old mathematicians, who have an idea that *something* can be measured from *nothing*, and found their premises upon geometrical nomenclature, not the true idea they have of their nature—such as "a point is said to have position without magnitude, and a line has length without breadth or thickness—or is a succession of points; but Mr. Smith is backed up by somewhat old authority, and if the subject be correctly understood, his "new element" is not altogether new. In Davison's Repository, as we learn by the London Mechanics' Magazine, Nov. 9, Question 62, Mr. Lowery observes, "that an infinitely small quantity, taken an infinite number of times, is equal to a finite quantity, and it is upon this principle that the whole science of Geometry rests; for a line is made up of an infinite number of points, infinitely small; a plane is made up an infinite number of lines, infinitely narrow, and a solid is made up of an infinite number of planes, infinitely thin—consequently, an infinite small quantity, taken an infinite number of times, is equal to a finite quantity." There now, let our fighting geometricians, sheath their swords; Mr. Smith's idea about a unit is the same as that taught by Prof. Davies, in his Logic of Mathematics.

Nature of a Patent Right.

The true nature of a patent right is best understood, and, indeed, can only be truly understood, by attentively considering the claimants of inventions which are indisputably patentable. Examine, for instance, the invention of Kneller, for an improvement in the manufacture of sugar, by introducing air-pipes into vessels containing syrup, and thus quickening the process, upon the principle that evaporation is promoted by a current of air. If we analyze this invention, of what do we find that it consists?

The process of evaporating syrup was the subject matter upon which the inventive power of Kneller was employed. The process which he undertook to improve, had long previously been the property of the public. This old process, therefore, was no part of Kneller's invention. But further, the natural law that a current of air promotes evaporation, was applied by Kneller to the process in question, by means of introducing pipes into vessels containing syrups. Suppose I should have employed some other mode of introducing air currents to the syrup, without effecting thereby any material improvement. In so doing I should have infringed upon Kneller's patent—for merely formal changes of an apparatus, do not constitute a distinct invention; hence, it follows, that the peculiar mode in which Kneller introduced his pipes into the syrup, was not a material part of his invention,—and in order to ascertain in what the invention of Kneller intrinsically consisted, we must exclude from consideration the feature alluded to,—that a current of air promotes evaporation was a well-known law. The question recurs,—what was the *essence*, the *spirit*, of this invention of Kneller? It was this: the application of a natural law, by practical means, to effect a certain result.

Kneller's patent protected both his own mode of applying the natural law in question, and also all merely *equivalent* means of applying such laws.

But, it may be asked "if Kneller's invention be irrespective of form, and founded on a natural law, does he not monopolise an abstract principle, which is, and forever ought to be, the property of all mankind?"

By no means; Kneller only monopolized the *application* of a natural law to the production of a certain result, by a certain class of means. In other words, his invention was *a principle embodied in practice*. And such is the distinctive character of the great mass of patent rights.

WATT.

Another Steamboat Explosion.

The steamboat A. Douglass exploded her boiler, at Tate's Shoals, on the Mississippi River, on the night of the 26th ult. It is supposed that 40 or 50 persons have lost their lives, as all the passengers were asleep at the time. When will such crimes be punished, as they deserve, in our country?

Within the last ten years, says the London Chronicle, 150,000 Mormons have emigrated from Great Britain to the United States, most of them men of some means, from Wales and the Northern and Eastern parts of England.

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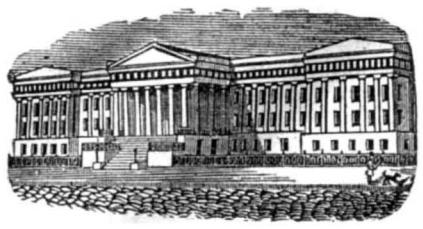

☞Reported expressly for the Scientific American, from the Patent Office Records.

LIST OF PATENT CLAIMS
Issued from the United States Patent Office.

FOR THE WEEK ENDING NOVEMBER 27, 1850.

To Smith Beers, of Naugatuck, Conn., for improvements in machines for turning irregular forms.

I claim the mode herein described, of changing the position of the ratchet, by means of the arrangement of the sliding rod, knee, lever, lifting plate, and pawl.

To H. J. Betjemann of Cincinnati, Ohio, for improvement in machines for boring dovetailed mortises.

I claim, first, the rotating cutters, (five) formed and arranged substantially as described, with conical heads and cylindrical necks, in combination with a rest or movable table, for the reception and attachment of the bedpost, the said table, while being advanced towards the cutters, being conducted by suitable guides (three) as described, either upon the moving table or the stationary bench, in a course which is at first at right-angles to the face of the post, and thence, as soon as the cylindrical cutter has begun to act in a longitudinal course, receding sufficiently from the face of the post to form a mortise which shall bind the dovetailed tenons of the rail, as they are pressed down in their sockets.

Second, I claim, in combination with the aforesaid guides, the stops, substantially as here arranged and applied, or their equivalents, whereby the table is limited in its course to the particular range of cutting action required for the time being.

To Joseph Dilks, of Philadelphia, Pa., for improvement in the Alarm and Indicator for Steam Boilers.

I claim the peculiar method of moving the indicator by its attachment to the side valve of the whistles, by which the connection is continued through the head of the boiler, as herein described, dispensing with the stuffing-box and packing.

To W. H. Horton, of Newburyport, Mass., for improved arrangement of the bending rollers in tin cutting and bending machines.

I claim to so combine and arrange the rollers, with respect to the jaws, as specified, so as to enable the said roller to be operated in the manner substantially as set forth; that is to say, to be moved in a plane parallel to the common axes of the shafts, the said roller being arranged in a turning frame and supported by a movable and adjusting frame; and the object of my improvement being to enable a person to move the roller against the tin in the manner and for the purpose of binding it down, substantially as hereinbefore explained.

To Wm. Kelly, of Eddyville, for improvement in the Metallic Flask for casting large Kettles.

I claim the elastic iron core, supporter, or inner part of the flask, constructed of wings attached to the crown, and provided with covering strips, substantially as described.

To Orville Mather, of Cincinnati, Ohio, for improvement in machines for Dressing Spokes.

I claim, first, constructing a cylindrically rotating cutter head, with a separating joint athwart its middle, and in the plane of its rotation, so arranged as that, by the mutual advance or recession (in the direction of their axis of rotation) of the respective sections of the cutter heads, as they traverse the length of the stuff, the cutting edges are adapted to impart the varying outline and form required for the work.

Second, the shafts and weighted levers, in combination with other levers, and the links, or their equivalents, for sustaining in position the tongues upon the spoke, and the rollers upon the guides, and rendering them self-adjustable under all the circumstances which can affect them.

To Melville Otis, of East Bridgewater, Mass., for improved Nail Plate Feeder and Turner.

I claim, first, giving the alternating motion to the nipper rod, by means of a pair of jaws actuated by the opposite ends of a vibrating beam, one of the jaws being provided with a spring and toggle, which causes it to grasp and release the nipper rod, the whole operating substantially as described.

Second, I claim giving to the said rod its progressive advancing and slightly retrograde motions, by means of a pair of jaws actuated by a cam and an eccentric, and two springs, substantially as specified.

Third, I claim operating the follower, so that it is raised from the nail plate, and the nail plate from the lower cutting jaw of the machine, by means of a cam, a rock shaft, and a radius bar connected to one end of the follower, substantially as described.

Lastly, I claim transmitting the motion from the nail machine, by means of a lever beam and connecting rods, when the lever beam is hung upon a cranked centre, and the actuating connecting rod is provided with a knob acting upon a flat crank pin, substantially as described, whereby I am enabled, with facility, to throw my feeding machinery in and out of gear.

But I do not intend, hereby, to confine myself to the particular forms and proportions herein described, provided I construct a machine substantially the same.

To Harvey W. Sabin, of Canandaigua, N. Y., for improvement in Horse Rakes.

I claim, in my improved horse-rake, the device for raising the teeth, substantially to clear them of the hay, and dropping them again, by means of the apparatus, substantially as described, being worked by the draught of the team, when thrown into gear, at the will of the operator.

To Elisha Steele, of Waterbury, Conn., for improvement in Suspender Buckles.

I claim the construction of the buckle frame and attaching the tongue or points thereto, so that the tongue or points slide out or into the buckle, instead of acting upon a hinge or roller, as above described.

To Augustus Thayer, of Melden Bridge, N. Y., for improved Auger Handle.

I claim the construction of auger handles, substantially as set forth, that is, by making the principal part of the same, from end to end, of one piece of wood, or other material, securing the central portion through which the auger shank passes, with a metal band, and arranging a detent for holding the shank with machinery to operate it; the said handles being for use with augers, or any other tools to which it may be adapted.

To J. T. Trotter, of New York, N. Y., for improvement in Vulcanizing India Rubber.

I claim the use and employment of zinc prepared by the process described, whereby a hyposulphite, or similar preparation of zinc, is obtained, in combining with india rubber, for the purpose of curing or vulcanizing it, substantially as hereinbefore set forth, without the use of free sulphur in any way, in combination with the rubber.

RE-ISSUES.

To Charles Davenport & Albert Bridges, of Cambridgeport, Mass., for improvement in the manner of constructing Railroad Carriages, so as to ease the lateral motion of the bodies thereof. First patented May 4th, 1841.

We claim connecting the said turning bearing to the truck frame of the above described kind, resting on four wheels or more, by a mechanism, substantially such as described, that shall not only allow such turning bearing independently of the wheels and axles a lateral play movement or movements, in directions transversely of the carriage, but bring or move it back to its central position after the lateral deflective force has ceased to act.

DESIGNS.

To Samuel Pierce of Troy, N. Y., (assignor to Johnson Cox & Fuller,) design for Stoves.

Cotton Spindles of the World.

The London Examiner gives the following tables as an estimate of the number of spindles engaged in the cotton manufactory throughout the world:—Great Britian, 17,500,000; France, 4,300,000; United States, 2,500,000; Zollverein States, 815,000; Russia, 700,000; Switzerland, 650,000; Belgium, 420,000; Spain, 300,000; Italy, 300,000. Total, 28,585,000.

Gravitation—What it is.

Under this heading, a writer (W. K.) in last week's Scientific American, puts forth some ideas, which are incorrect and contradictory. He says—

"Gravitation is that property of matter by which it resists a change of state, with respect to motion or rest. This will, no doubt, be considered a sweeping declaration." &c. It is a sweeping declaration, but only a declaration. If he had used the word *inertia* instead of "gravitation," he would have given us, word for word, the very proposition of Newton, as relating to *vis insita;* the only difference between the two is, that Newton is nearly right, while W. K. is the very opposite. If gravitation is that law which resists a change of state, as set forth above, it is very easy to prove it. It is just this—every body once in motion, must forever continue in motion; a ball, shot from a riffle, will forever continue fleeting through space. It is in motion, you see, therefore it will resist a change of state to rest. Now, how is it that a ball, shot from a rifle, is brought to a state of rest? We can easily understand how it gets motion, or, in other words, has changed its state of rest, viz., by the *impact* of a *superior* force; but, then, no powder, no human hand touches it while fleeting through the heavens; and how does it come to a state of rest? Take away the known law of gravitation—that principle of attraction in all bodies—and we cannot explain it; but with it we can explain the phenomenon. By the laws of Inertia and Gravitation, we can explain all the deflections, all the motions, and the forms of moving bodies, but not by the declaration above. The whole of the reasoning, to prove his proposition, is inappropriate. I cannot see how it applies to, or dovetails with, his text. Instead of proving his proposition, his exposition relates wholly to the composition of forces, an entirely different subject. One of the most singular ideas set forth by him is this—

"If this is the true philosophy of gravitation, then we are at once introduced to the true reason why its force is always in proportion to the quantity of matter. When we lift a stone from the earth, we separate two bodies, containing a vast amount of matter, for which reason we experience a great opposition. When the stone is small, it leaves the earth to move only a small distance, it is true, but as all motion is mutual, and proportional to the two bodies themselves, the earth must, upon the lifting of the stone, recede her proportion. When we double the volume of the stone to be raised, then, although the quantity of matter contained in both is the same, yet because the earth, the greater of the two, is obliged to recede twice the distance, we experience twice the difficulty in raising it; we therefore say, the stone has twice the weight of the former."

Now, sir, this is not correct: force is not always in proportion to the quantity of matter. Laboring force embraces weight, or gravity, and velocity. One body having just half the quantity of matter as another, may have the same amount of force, yea, ten times the amount. A ball, weighing one ounce, has as much force as one weighidg a pound, if the same quantity of powder is used to propel each. What he says about lifting the stone is droll.

He forgets that there are properties belonging to matter which are named magnitude and density, and these properties must be considered apart from distance or space. One pound moved through 100 feet of space, in one second, has as much force as 60 lbs. moved through space at a velocity of 100 feet per minute. About lifting the stone, and the receding of the earth, is very amusing, as it seems that, doubling the volume of stone, the quantity of matter is not increased; that is, there is just the same quantity of matter in one pound of sugar that there is in two:—W. K.'s wife, if he has one, could never become a believer in this doctrine. A pair of scales could easily convince him that he is in error. The most singular announcement which he makes, is as follows:

"We can move a weight, not only about three times greater in a horizontal than in a perpendicular direction, but even ten, fifty, or a hundred times as great. The reason is plain, there being no separation of bodies, there can be no re-action in a direction towards each other,—the force, therefore, thrown upon the body is constant, and although we can scarcely see the effect at first, yet, as the force is every instant accumulating, therefore, by continued pressure, we can move a much greater body in a horizontal than in a perpendicular direction."

There, engineers, don't you see that a horizontal is a hundred times more powerful than a vertical engine. This, however, is not the meaning of W. K., but it shows how he confuses subjects—he has not a clear understanding of them. The fact is, direction of motion has nothing to do with the subject; there is no difference in the force of one body from another, if both have the same momentum—let them be moving in any direction, horizontal or perpendicular. I was sorry to see such an idea advanced as the following:—"The elements of matter are unoriginated, hence they have already passed through an infinite number of modifications, in which every particle of matter has been associated with every other particle, from which it has since been projected." He deduces the above from the laws of action and re-action. He might just as well have said, that he himself was not originated, because there is an inherent principle of self-preservation within his breast. How he accounts for matter passing through various modifications, the association of particles, and then their separation, is a problem; such events could never happen, if his theory was true; never.

It is not long since that a writer in the Scientific American *discovered* the same law as W. K., giving it another name, but he was going to make vessels cross the Atlantic in a few days by it.

The laws of Mechanics are not generally nor well understood. With your permission, gentlemen, I will pursue the subject in some subsequent articles. MACLAURIN.

The Cotton Worm.

MESSRS. EDITORS—In No. 4, page 27, of the present volume of the Scientific American, is an article under the head of "Cotton Worm," which speaks of a destructive insect, a *fly*, resembling the "Candle Fly." In my researchss in entomology I never came across an animal of such a denomination; no doubt the misnamed insect is a Papilio, Noctua Gossypii, a native of South America, blown to our Southern States when in the winged state, and becomes destructive when, on its arrival, the cotton is in full bloom; if later, it is a welcome customer. So I found it in 1812, in South Carolina, where the cotton had ripened into pods, and nothing left for it but the leaves, on which it fed, by which means the planters reaped a cleaner crop, free from the small particles of the leaves. Fortunately, this insect cannot endure our climate, or else it would become naturalized. The manner of destroying the fly, as stated by the writer, would rather be inefficient—examining the blossoms; what a labor! The quicker way would be to set the whole crop on fire, and is more sure than inviting these guests to a dish of molasses—a luxry to bees, wasps, and hornets, but not to papilios, who only suck nectar from flowers. The only method our planters have tried, was to light fires near by, in calm nights, around the cotton fields, which attracts moths.

Savannah, Oct. 20, 1860. A. G O.

[The article referred to, in the above letter, was an extract from another paper, and credited to that paper. We did not endorse, nor make any comments on it.—ED.

Freshets.

It is our opinion that there have been more freshets in our country, this season, than any other within our recollection. Last week the village of Cleveland, Oswego Co., was visited with a destructive freshet in the rising of Black Creek, which carried away five dams and two bridges.

The Toronto papers estimate the surplus wheat of Upper Canada this season at 7,000,000 bushels more than last, which was 4,000,000—making 11,000,000 bushels.

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TO CORRESPONDENTS.

"A. T., of Vt."—If we correctly understand your invention, it possesses so little novelty that it would not be considered the subject of a patent.

"G. W. C., of Me."—Your papers which were forwarded to us a long time since, we have filed. If you design to furnish the patent office with a new model, you will be obliged to send new papers entire, and pay additional fees. We should advise you to send back to the office your old papers, and petition for a withdrawal and then commence anew.

"S. L. S., of N. Y." the model of your planter has been examined. We can see nothing new in it on which a claim could be sustained. The only point of difference between yours and the one patented by J. P. Goshen, in March last, is the employment of a roller having an eccentric groove on its face. Grooves like the one shown in your model have been employed in opening and closing valves in engines, and for other purposes. Its application to this purpose could not be considered a patentable subject.

"S. T. G., of Geo."—We have examined the contents of your letter, and are of the opinion that your plan is new. Two needles, we think, are employed in Mr. Brooman's machine, We have never seen it. The shuttle has not been dispensed with, and in this respect yours is without doubt new, but to determine this point, we should require either a model or a well described drawing.

"H. J. B. C., of N. C."—Yours of the 25th inst. has come to hand. We shall endeavor to obtain the information you require as soon as six or eight days from this. We could not answer you immediately as we had not the information.

"W. L. & W. Z., of N. Y."—We have attended to your business, and presume it will all come straight.

"I. D. B., of Berlin, Canada."—On page 1, Vol. 3, Scientific American, you will find an engraving of such a pump as you refer to. $1 received; your subscription will now expire with No. 33.

"C. P., of Ohio."—We are much obliged for your complimentary letter; glad to hear that the Scientific American is well received by a farmer. We may add our opinion that you have paid yourself a high compliment. Farmers should always be scientific.

"S. T. B., of N. Y."—The principle of your rotary engine is very old, see page 72, Vol. 4, Sci. Am. No patent could be obtained upon it.

"S. I., of N. Y."—Your substitute for the crank is among the oldest for that purpose ever brought forward. It is worth nothing, and is much inferior to many other plans which have been tried. The device is more than twenty years old. Try again.

"J. C. M., of Ohio."—We do not see how you could get a patent. The same principle is embraced in a curved arm cutter, which is old and well known.

"J. T., of Pa."—We omitted to state that we could see nothing of a patentable character in your re-action water-wheel, and could not advise you to make application for a patent.

"A. G. O., of Geo."—Yours by some accident was misplaced. We do not know the price of Haine's Calculator; Avery's Pump is free property—there are none made at present.

"S. S. M., of Mo."—No patent can be obtained on the mortising machine. The parallel rack motion is a well known device for purposes analagous to that for which you design to employ it. This principle applied to mortising machines would not, in our opinion, be as good as some others we have seen.

"A. O., of N. Y."—The law provides that no patent shall be held invalid by reason of the purchase, sale, or public use of an invention, prior to application for Letters Patent, unless such purchase, sale, or public use has been for more than two years prior to such application. This will preclude Mr. B. from obtaining a good valid patent. This fact, when known to a court, would destroy the patent. No amendments have been made to the laws since 1849.

G. H. R., of Ill.; A. W. P., of Ohio; W. B. W., of Ala.; C. T. W., of Ky.; and W. F. & Co., Ireland. Your letters will be answered as soon as we can obtain the information you desire.

"C. A. R., of Conn."—We have examined your device, and believe it to possess novelty sufficient to warrant an application for Letters Patent. The combination of the traversing bars, cams, and revolving heads, is the only point upon which a claim could be based. We advise you to send a model without delay to this office. The principle appears to be good.

"A. B. J., of Md."—Yon can consult us confidentially. Inventions are not exposed in this office to any one except our examiners.

"R. Y., of Pa."—Why was it not established at the Philadelphia trial, that Battin's Breaker was old. It will not do in a case of law to say that the principle is not a good one, if it is not good why do defendants use it We have seen a great number of machines in Europe, but not one *exactly* like it. We believe, with yourself, that other machines may be made to work as well, if not better. If Mr. C. gets a patent for a mill, and it is the same as has been made and long used by you, then, upon proof, his patent will be void. You could not obtain a patent on the match gum varnish—shellac has been used for the same purpose. It is a good plan, however.

Money received on account of Patent Office business, since Dec. 4, 1850:—

H. W., of N. Y., $50; L. I. W., of R. I., $30; Miss L. A. S., of Pa., $50; S. T. S., of Mass., $30; A. D. S., of N. Y., $50; W. & F., of N. Y., $25, and T. H. B., of N. J., $10.

Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and the year the patent was granted (adding the month of the year when convenient), and enclosing one dollar as fee for copying.

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Patent Office.

128 FULTON ST.

NOTICE TO INVENTORS.—Inventors and others requiring protection by United States Letters Patent, are informed that all business relating to the procuration of letters patent, or filing caveats, is transacted at the Scientific American Office, with the utmost economy and despatch. Drawings of all kinds executed on the most reasonable terms. Messrs. Munn & Co. can be consulted at all times in regard to Patent business, at their office, and such advice rendered as will enable inventors to adopt the safest means for securing their rights.

Arrangements have been made with Messrs. Barlow and Payne, Patent Attornies, in London, for procuring Letters Patent in Great Britain and France, with great facility and dispatch.

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WATER-PROOF BLACKING—G.R. Townsley having received Diplomas from the various Fairs, where his celebrated Water-proof Blacking has been exhibited, takes this method of informing the public that he continues the manufacture of it at Springfield, Mass. Each box of blacking contains a sufficient quantity to last one person for six months, and it is warranted to render boots impervious to water, gives a good polish, and is a preservative to leather. Address G. R. TOWNSLEY, Springfield, Mass.—A sample may be seen at this Office. 18 4*

PATENT BREAD CUTTER.—The subscriber is now prepared to sell rights for a single State, or for all the States, except Connecticut, Vermont and Maine, on liberal terms. The Cutter will be wanted in almost every family, and will sell readily at a large profit to the manufacturer. Personal application, or by letter (post-paid) directed to the subscriber at Berlin, Conn., will receive prompt attention. FRANKLIN ROYS.
12 10

FOR SALE—A good second-hand Steam Engine, 8 inch cylinder, 32 inch stroke, with one boiler, 3 feet diameter, 22 feet long, with one 16 inch flue, refitted in good order. CHUTE, BROTHERS,
13 4* Schenectady, N. Y.

DICK'S GREAT POWER PRESS.—The public are hereby informed that the Matteawan Company, having entered into an arrangement with the Patentee for the manufacture of the so-called Dick's Anti-Friction Press, are now prepared to execute orders for the following, to which this power is applicable, viz.—Boiler Punches, Boiler Plate Shears, Saw Gummers, Rail Straighteners, Copying and Sealing Presses, Book and Paper Presses, Embossing Presses, Presses for Baling Cotton and Woollen Goods—Cotton, Hay, Tobacco, and Cider Presses; Flaxseed, Lard, and Sperm Oil Presses; Stump Extractors, &c. &c. The convenience and celerity with which this machine can be operated, is such that on an average, not more than one-fourth the time will be required to do the same work with the same force required by any other machine.

WILLIAM B. LEONARD, Agent,
13tf No. 66 Beaver st., New York City.

BARNUM'S PATENT PLANING MACHINE.—Contracts may now be made for the construction or use of these machines in any part of the U. S.: they not only possess equal facilities with any other, for planing coarse lumber for flooring, &c, but remove all the objections urged against machine planing, for doing work suitable for the finest purposes required in house, ship, or steamboat building, finishing the material with the grain, and fully equal to hand planing, leaving no indentations on the surface of the board, (as in all machines using pressure rollers in planing, by the chips and knots collected passing between the planed surface and weighted feed rollers, thereby destroying fine work, designed for painting, &c.) as there is no appliance whatever on the planed surface Apply to DANIEL BARNUM, Snowden's Wharf, Philadelphia, where the machines may be seen in constant operation. 13 5*

AMERICAN AND FOREIGN PATENT AGENCY.

WE WOULD remind our numerous friends throughout the country, that we still continue to conduct the business of procuring Letters Patent for new inventions in this and all foreign countries, where the right is recognized Since making arrangements with those eminent attorneys, Messrs. Barlow, Payne & Parken, Editors of the London Patent Journal, we have secured and managed through them, several foreign applications, with the utmost economy and facility. Inventors and others, desiring advice upon this subject, can correspond confidentially with the Editors of this paper.

CLOCKS FOR CHURCHES, PUBLIC Buildings, Railroad Stations, &c.—The subscriber having made important improvements in the apparatus for counteracting the influence of the changes of temperature upon the pendulum, and in the retaining power, together with a most precise method of adjusting the pendulum to correct time, are prepared to furnish Clocks superior to any made in the United States, both for accuracy of time-keeping and durability. They speak with confidence, from having tested their performance for several years. All clocks ordered and not proving satisfactory, may be rejected. Address SHERRY & BYRAM,
Oakland Works, Sag Harbor, L. I.

"Mr Byram has established his reputation as one of the first clock makers in the world"—[Scientific American. 4 3meow*

A MANUFACTURER WANTED.—I wish to employ for a term of years, a man of industrious habits, good moral character, not more than 40 years of age, qualified to manage and superintend hands in a cotton and spinning factory, and who is a first rate carder and spinner. The location is a healthy one, machinery propelled by water, 700 to 1000 spindles; salary liberal. Nothing short of the most satisfactory recommendations will be considered. Address the subscriber, immediately, at McMinnville, Tenn. WILLIAM BLACK.
Central Factory, Tenn., Nov. 25, 1850. 12 4

COTTON MACHINERY FOR SALE—Viz. 4 filling frames, 144 spindles each; dead spindle, nearly new; 1 three head drawing frame, with extra rolls; 1 Mason's speeder, 16 strand; 1 lapper; 1 cone willower; 1 band machine; 1 bundling press; 1 warper—on very reasonable terms, by ELI WHITNEY.
New Haven, Nov., 1850. 9 6*

ALCOTT'S CONCENTRIC LATHES.—We have on hand a few of these celebrated Lathes, which the inventor informs us will execute superior work at the following rates:—

Windsor Chair Legs and Pillars, 1000 per 11 hours. Rods and Rounds, 2000; Hoe Handles, 800; Fork Handles, 500; Broom Handles, 150, per 11 hours.

This Lathe is capable of turning under two inches diameter, with only the trouble of changing the dies and pattern to the size required. It will turn smooth over swells or depressions of 3-4 to the inch, and work as smoothly as on a straight line, and does excellent work. Sold without frames for the low price of $25—boxed and shipped, with directions for setting up. Address, (post paid) MUNN & CO.,
14tf At this Office.

IMPORATANT NOTICE TO CONFECTIONARY MAKERS—Whereas, a patent was granted to the undersigned, Oct. 8th, 1850, for an improvement in the manufacture of Comfits, and from certain knowledge which he has received, he believes that parties are using it without his consent. Vigorous measures are now being taken to ascertain who the unprincipled parties are, in order that they may be dealt with according to law. This notice is to warn all not to infringe the patent, as it is not the intention of the patentee to dispose of rights. Parties using it will have no authority. W. H. HOLT, Patentee.
Hartford, Conn., Nov. 25, 1850. 11 8*

THE SUBSCRIBER is now finishing four 14 horse engines, with boiler and apparatus all complete—price $1200 each. Several 6 horse engines extremely low; also, several of smaller capacity, complete; also, several power plainers, now finishing.—Galvanized chain for water elevators, and all fixtures—price low—wholesale and retail. Orders, post-paid, will receive prompt attention. AARON KILBORN.
No. 4 Howard st., New Haven, Conn. 11 6*

MACHINES FOR CUTTING SHINGLES. The extraordinary success of Wood's Patent Shingle Machine, under every circumstance where it has been tried, fully establishes its superiority over any other machine for the purpose ever yet offered to the public. It received the first premium at the last Fair of the American Institute—where its operation was witnessed by hundreds. A few State rights remain unsold. Patented January 8th, 1850,—13 years more to run. Terms made easy to the purchaser. Address, (post-paid) JAMES D. JOHNSON, Redding Ridge, Conn., or Wm. WOOD, Westport, Conn.. All letters will be promptly attended to. 10tf

UNITED PATENT OFFICE IN PARIS AND LONDON.—GARDISSAL & CO., 29 Boulevard St. Martin, Paris, and No. 9 Arthur st. west, city, London. Patents procured in Great Britain and on the Continent: "Le Brevet d'Invention," weekly journal, published by the same firm. 3tf

GURLEY'S IMPROVED SAW GUMMERS—for gumming out and sharpening the teeth of saws can be had on application to G. A. KIRTLAND,
205 South st., N. Y. 10 6

SCRANTON & PARSHLEY,—New Haven, Conn., will have finished by the 15th of December, 12 Engine Lathes of 8, 10 and 12 feet beds, and weigh 1500, 1650, and 1800 lbs; price $200, $220 and $240. These Lathes are from a new set of patterns, and are greatly improved from their former small size lathes; they swing 21 inches, and have back and screw gearing, centre rest, follow rest, drill, chuck and overhead reversing pulleys, all hung in a cast iron frame, ready for use. On and after the first of Dec., by addressing as above (post paid) cuts can be had of these, with index card, showing the different pitch threads that these lathes will cut.

Two of the power planers heretofore advertised in this paper, are now ready to ship to the first order; they weigh from 4500 to 4600 lbs., when finished. 9tf

A CARD.—The undersigned begs leave to draw the attention of architects, engineers, machinists, opticians, watchmakers, jewellers, and manufacturers of all kinds of instruments, to his new and extensive assortment of fine English (Stubs) and Swiss Files and Tools, also his imported and own manufactured Mathematical Drawing Instruments of Swiss and English style, which he offers at very reasonable prices. Orders for any kind of instruments will be promptly executed by F. A. SIBENMANN, Importer of Watchmakers' and Jewellers' Files and Tools, and manufacturer of Mathematical Instruments, 154 Fulton street. 1 3m*

TO PAINTERS AND OTHERS.—American Anatomic Drier, Electro Chemical graining colors, Electro Negative gold size, and Chemical Oil Stove Polish. The Drier, improves in quality, by age—is adapted to all kinds of paints, and also to Printers' inks and colors. The above articles are compounded upon known chemical laws, and are submitted to the public without further comment. Manufactured and sold wholesale and retail at 114 John st., New York, and Flushing, L. I., N. Y., by
QUARTERMAN & SON,
9tf Painters and Chemists

COTTON, WOOLEN AND SILK MANUFACTURERS' DEPOT.—ANDREWS & JESUP. No. 70 Pine st., N. Y., dealers in articles for the use of Cotton, Woolen and silk manufacturers, and agents for the sale of shearing, carding, burring, napping, wool-picking, flock-cutting and waste machines, regulators, satinet and jean warps, &c. Weavers' reeds and heddles, bobbins and spools, of every description, made to order. Sperm, lard and olive oils and oil soap. 1tf

MACHINERY.—S. C. HILLS, No. 12 Platt Street, N. Y., dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills Kase's, Von Schmidt's, and other Pumps, Johnson's Shingle machines, Woodworth's, Daniel's and Law's Planing machines, Dick's Presses, Punches, and Shears; Morticing and Tennoning Machines, Belting, machinery oil; Beal's patent Cob and Corn Mills; Burr Mill, and Grindstones, Lead and Iron Pipe, &c. Letters to be noticed must be post paid. 10tf

BAILEY'S SELF-CENTERING LATHE, for turning Broom and other handles, swelled work, chair spindles, &c.; warranted to turn out twice the work of any other lathe known—doing in a first rate manner 2000 broom handles and 4000 chair spindles per day, and other work in proportion. These lathes are simple in construction, not liable to get out of repair, and will do enough more than other lathes, in three months' use, to pay their cost. One of them may be seen at the office of Munn & Co., New York. Price of Lathe for turning broom and hoe handles, rake stales, scythe snaths, windsor and cottage chair legs and pillars, $100, with one set of tools; $125 with two sets. Lathe for turning chair spindles, whip stocks, gun rods, &c., complete, $75. Orders, post-paid, may be forwarded to L. A. SPALDING,
Lockport, N. Y. 93m

LAP-WELDED WROUGHT IRON TUBES for Tubular Boilers, from 1 1-4 to 7 inches in diameter. The only Tubes of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine, and other Steam Engine Boilers.
THOS. PROSSER & SON, Patentees,
8tf 28 Platt st., New York.

HISTORY OF PROPELLERS.—This interesting and useful volume, compiled by one of the Editors of the Scientific American, from articles previously prepared for, and published in, Vol. 5 of that paper, is now ready for the Trade. It contains 144 pages of letter-press, and 82 illustrations, embracing views of nearly every kind of propeller that has been invented. This work is beautifully bound in cloth, and is sold at the low price of 75 cts. We also have them in paper covers, for mailing—price as above. Address MUNN & CO., at this Office.

FOREIGN PATENTS.—PATENTS procured in GREAT BRITAIN and her colonies, also France Belgium, Holland, &c., &c., with certainty and dispatch through special and responsible agents appointed, by, and connected only with this establishment.—Pamphlets containing a synopsis of Foreign Patent laws, and information can be had gratis on application
JOSEPH P. PIRSSON, Civil Engineer,
46tf Office 5 Wall street, New York.

BOSTON LOCOMOTIVE WORKS—No. 380 Harrison avenue, Boston, manufacture at short notice, Locomotive and Stationery Steam Engines, boilers,—iron, copper, composition and brass castings; copper work; Van Kuran railroad car and truck wheels, and all kind of railroad machinery.
DANIEL F. CHILD,
1tf Treasurer Boston Locomotive Works.

FELLY CUTTING MACHINE.—MESSRS. JOSEPH ADAMS & SONS, Amherst, Mass., offer for sale town, county and State rights, or single machines, with the right to use, of this unrivalled Felly Cutting Machine, illustrated in No. 5, Vol. 6, Scientific American. It is portable, easily kept in order, requires but little power to drive it, and will execute in the most rapid and perfect manner, cutting 60 good fellys in one hour. 6tf

RAILROAD CAR MANUFACTORY.—TRACY & FALES, Grove Works, Hartford, Conn. Passage, Freight and all other descriptions of Railroad Cars, as well as Locomotive Tenders, made to order promptly. The above is the largest Car Factory in the Union. In quality of material and in workmanship, beauty and good taste, as well as strength and durability, we are determined our work shall be unsurpassed. JOHN R. TRACY,
5 tf. THOMAS J. FALES.

FOWLERS & WELLS, Phrenologists and Publishers, Clinton Hall, 131 Nassau st., New York—Office of the Water Cure and Phrenological Journals. Professional examinations day and evening. 3 6m

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Scientific Museum.

Scientific Memoranda.

LEAD.—The appearance and properties of common metallic lead are well known. It is of a bluish grey color and very heavy; it is soft and ductile to a limited extent; when cut it has a brilliant metallic lustre, which, however, is soon tarnished by exposure to the air. It melts at 630° Fahrenheit. Lead is commonly obtained from the ore called galena, which is sulphuret of lead. This ore is roasted in a proper smelting furnace, by which the sulphur is driven off in fumes, and the pure metal remains.

AMERICAN BEES IN ENGLAND.—The Manchester Guardian states that a gentleman of Smedly has a small colony of bees from Central America. They were brought to England in a piece of logwood from the Gulf of Honduras, and were discovered by the present owner in an almost torpid state, among the decaying bodies of their kinsfolk and fellow citizens, who had been crushed, frozen, drowned, and "done to death" in a thousand ways, by the casualities of their rough transportation.—Being nourished by artificial heat, and hived in a small pyramidical box with glazed windows, the remnant of the race seem to have forgotten the pains of exile in the bustle of their active occupation, and bid fair to survive the approaching severites of a northern winter.

They are exceedingly diminutive, not much exceeding in size some species of black ants, and are of the same uniform color. They are very active. Their style of working is as peculiar to themselves as their personal appearance. Instead of building the cone with the beautiful regularity and precision attained by their kindred, whose labors have been celebrated in verse familiar to the infant mind, they raise perpendicularly from the floor of the hive an irregular but graceful tree, like a coral branch, and appear, as far as they have yet gone, to be engaged in dividing this fabric into stories, and building round about it a circular tower. The honey is similar in appearance to preserved tamarinds. The queen bee is stated to be as large as a wasp.

ANOTTA DYE.—This beautiful summer color is one of the readiest known to the good housewife; but as there are some who have to make it, we will give them the simple direction. First, be careful to procure the article pure, as it is one very subject to adulteration. Cut it into small pieces and boil it in soft water with an equal weight of pearlash, in a copper boiler, say one pound to four gallons of water. Rinse the articles to be dyed in clean water, and then dip them in the dye and air them, and then let them boil some time; take out and rinse. The quantity of anotta used must be regulated entirely by the depth of color required. A little experience will soon teach that.—[Am. Ag.

[The above color may well be termed a "beautiful summer color," for it will last, in the sunshine, the better part of five minutes. Anotta dyes salmon and orange colors, but they are very fugitive. The way to prepare it, as above set forth, is correct, to dye salmon and buff; but, to dye an orange, the goods must get a very strong bath of anotta, and afterwards must be run through a solution of strong vinegar and water, or diluted sulphuric acid, after which they must be well washed. It will dye cotton and silk equally well, but it will spoil the texture of woollen goods. Anotta colors should never be used for cloths exposed to the air or sun out doors, excepting in the shape of a silk ribbon shaded by a parasol. Our country-people should learn to dye nothing but fast colors.

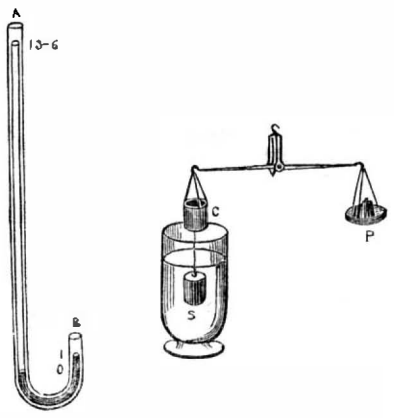
Flax Cotton.

A very important event has recently taken place in Manchester, England. It is nothing less than the spinning of flax on cotton machinery without any alteration of the same. The flax was prepared by a new process recently introduced into Britain and Ireland. The London Morning Chronicle states that "rovings and yarns, spun on cotton spindles without the slightest alteration having been made, were produced ready for weaving, and the strength, color, and quality of the yarns were everything that could be desired. It is intended to exhibit the whole process at the great Exhibition, along with fabrics made from it. If flax can be manufactured by cotton machinery at but little expense, it will have a tendency to supersede cotton fabrics in a great measure, but perhaps the announcement is merely to touch the sensibility of cotton brokers.

Hydrostatics.

(Continued from page 96.)

FIG. 9. FIG. 10.



If fluids of different densities, such as water and mercury, be made to communicate, the height which they will rise in a vessel, A B, fig. 9, will be respectively in the inverse ratio of their densities. If the bend be first filled with mercury, and water then poured into A, a column of that fluid 13.6 inches high, will be necessary to balance one inch of mercury in B—mercury being 13 6-10 times denser than water. It does not matter how unequal the bore of the two branches of the tube may be.

The specific gravities of different bodies are usually compared with water as a standard. When a solid is immersed in a fluid, it displaces as much fluid as that of its own bulk. When a fluid is lighter than a solid, bulk for bulk, the solid, like lead, will sink—if lighter it will float, like wood.

A solid cylinder of metal, like S, fig. 10, exactly fitting into a hollow cylinder, C, of the same metal, is suspended from an arm of a balance, and brought into equilibrium by weights in the opposite scale pan, P. The solid cylinder is allowed to dip into an empty glass, which, on filling it up with water, so as to cover the solid cylinder, S, until the scale pan, P, will sink down in consequence of the apparent loss of weight in the solid cylinder. Now, on filling up the hollow cylinder, C, with water, the balance is restored. The fluid support given to S, is represented by the weight of water, in C, which is required to restore the equilibrium of the balance, and as S exactly fits into C, the bulk of water poured into C must be exactly equal to that displaced by S.

And this would be true, whatever might be the material of S, whether gold or cork. If it were cork, it would appear to lose more than its whole weight, or to acquire, when immersed, a levity or upward tendency, which, however, is still found to be neutralized, and its exact weight restored, by filling C. It is scarcely necessary to observe, that all apparent instances of a tendency the reverse of gravity, as in smoke, balloons, &c. are only effects of this kind, depending on the pressure of surrounding fluid, which must be denser than the rising body.

In ascertaining the specific gravity or density of a solid denser than water, it is first weighed in air and then in water. By subtracting the weight of the substance in water from its weight in air, and dividing the latter by the difference, the product will be the specific gravity required. For example, a piece of gold weighs in air 77 grains, and in water 73 grains; then 77—73=4; and 77-4=19¼. The proportion, therefore, of the weights of equal bulks of the metal and the water, is 77 to 4; or 19¼ to 1. So that gold is 19¼ times heavier than its own bulk of water; and this number is called the specific gravity or density of gold. It is viously unimportant how much or how little be taken,—the specific gravity will be the same. It is equally unimportant whether the standard of comparison be taken as 1 or 1000. It is usual, however, to write the value of the standard decimally, thus—1.000. When, therefore, we say that the specific gravity of gold is 19¼, or 19.25, we mean that a quantity of water weighing 1 is exactly equal in bulk to a mass of gold weighing 19¼. The specific gravity of cork is only 0.24; that is, the mass of water which any given bulk of cork displaces on being plunged into it, is rather more than 4 times heavier than the cork. The specific gravities of liquids are taken by means of a bottle capable of holding exactly 1000 grains of water at a given temperature (such as 60° Fahr.) On filling this bottle with proof spirit it will, be found to contain only 837 grains; so that .837 is the specific gravity of proof spirit. If the bottle be filled with sulphuric acid of commerce, it will weigh about 1845 grains; and hence 1.845 is said to be the specific gravity of this acid. In taking the specific gravity of gases and vapors, atmospheric air is the standard.

When a body floats on a fluid, it displaces a quantity equal in weight to itself; (when it sinks, it displaces a quantity equal in bulk.) Hence the conditions of equilibrium in floating bodies are two:—1st. That the portion immersed: the whole bulk:: the density of the solid: that of the fluid. 2d. That the centre of gravity of the solid, and that of the fluid displaced, are in the same vertical line. The equilibrium, however, may be stable or unstable; and if stable, the body will, on being disturbed, return to its former position by a number of oscillations which are isochronal, like those of the pendulum; and their times depend on the position of a point called the metacentre, which has the properties of the point of suspension in pendulums.—When the metacentre is lower than the centre of gravity of the whole body, the equilibrium is unstable: otherwise it is stable.

Peruvian Mummies.

In an account recently given, of a very interesting discovery by Dr. Reid, of Mummies at Chinchin, the Doctor's opinion is stated to be that these persons had buried themselves to escape from the ravages of the Spaniards. This opinion is curiously corroborated by a passage in Surgeon Lionel Wafer's (surgeon to the Buccaneers who crossed the Isthmus in 1680) 'Voyages and Description, &c.' p. 208, London, 1699, as follow: "We also put ashore at Vermejo, in 10° S. lat. I was one of those who landed to seek for water. We marched about four miles up a sandy bay, which we found covered with the bodies of men, women and children. These bodies, to appearance, seemed as if they had not been above a week dead; but, if touched, they proved dry and light as a sponge or piece of a cork. We were told by an old Spanish Indian whom we met, that in his father's time, the soil there, which now yielded nothing, was well cultivated and fruitful,—that the city of Wormi had been so numerously inhabited with Indians, that they could have handed a fish from hand to hand till it reached the Inca, —but that when the Spaniards came and laid siege to their city, the Indians rather than yield to their mercy, dug hole in the sand, and buried themselves alive. The men as they now lie, have by them their broken bows, and the women their spinning wheels and distaffs with cotton yarn upon them. Of these dead bodies I brought on board a boy of about ten years of age, with an intent to bring him to England, but was frustrated of my purpose by the sailors, who had a foolish conceit that the compass would not traverse right whilst there was a dead body on board, so they threw him overboard to my great vexation.

Potato Cheese.

Boil the potatoes, and reduce them, when cold, to pulp; strain, and add sour milk, 1 pint to 5 pounds of pulp; it is then kneaded several times, and dried in the shade.

The cholera is very bad, just now, in the Island of Jamaica. Five doctors have fallen victims to it. There is considerable terror manifested by the population.

LITERARY NOTICES.

THE INTERNATIONAL MAGAZINE, for December, commences a new historical novel, by G. P. R. James—it bids fair to exceed in genuine merit and thrilling interest many of the choice productions of its versatile author. Independent of this attractive feature, the International furnishes a vast and sterling variety of American and foreign miscellany—rendering it the most interesting Magazine now published. Terms, $3. Stringer & Townsend, publishers, 222 Broadway, N. Y.

THE PULPIT REPORTER.—We have received from Messrs. Fowlers & Wells, 131 Nassau street, a copy of the "Pulpit Reporter," handsomely bound; it contains full sermons by upwards of a hundred of the most prominent living clergymen of this country, of various denominations. Here we have the effusions of such minds as Barnes, Dwight, Cheever, Welch, Lansing, Lord, Hutton, Taylor, and many others. The Pulpit Reporter is really a literary curiosity. A single volume, embracing such fine specimens of the powers of so many prominent individuals as are therein combined, has, we believe, never before been published, either in this or any other country. Every library should have the "Pulpit Reporter" among its contents.

SPECIMENS OF THE STONE, IRON, AND TIMBER BRIDGES &c., &c. OF THE U. S. RAILROADS.—Mr. George Duggan's work on Bridges has now attained to its 9th number, and it contains views of the bridge over the Lackawaxen, on the New York and Erie Railroad, and of the Railroad Suspension Bridge, by Joseph C. Avery, one of the Engineers on the Cleveland, Columbus, and Cincinnati Railroad. In Mr. Duggan's work there are specifications and working drawings of all the improved bridges in our country, and many of the finest structures in Europe. In every respect the work is a good one, and should be in the possession of all our engineers and architects. Each number costs 75 cents: to those who may desire numbers, we will execute orders for them.

ICONOGRAPHIC ENCYCLOPEDIA.—Part 14 of this unrivalled work is now issued, by Rudolph Garrigue, the enterprising publisher, No. 2 Barclay st.; it contains 20 beautiful plates, showing the "warrior array," ancient and modern, of all nations. We are happy to learn that this work has met with a patronage so liberal, that a second issue has become necessary. Those who do not take this work can have no idea of its beauty and intrinsic value. Those who wish to become subscribers have now a favorable opportunity presented them for that purpose.

REPLY TO ARCHBISHOP HUGHES.—We have received from Messrs. Dewitt & Davenport, Tribune Buildings, a copy of the Lecture delivered by the Rev. J. F. Berg, D. D., Philadelphia, in reply to Archbishop Hughes, of New York. It is a most able and eloquent production.

The same publishers have just issued a beautifully illustrated number of Sir Walter Scott's "Waverly," in imitation of the celebrated Abbottsford Edition, published in London a few years since. We hope they may meet encouragement sufficient to urge them to publish the complete series. Price 50 cents.

DICTIONARY OF MECHANICS AND ENGINE WORK.—Number 21 of this work, which is the commencement of the second volume, has articles on the High Pressure Steam Engine, Horse Power, Bogardus' Horse Power, Horse Shoe Machine, Hydrostatic Press, and articles on the Ice trade. Published by D. Appleton & Co., Edited by Oliver Byrne.

MECHANICS

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SIXTH VOLUME OF THE SCIENTIFIC AMERICAN.

The Publishers of the SCIENTIFIC AMERICAN respectfully give notice that the SIXTH VOLUME of this valuable journal, commenced on the 21st of September last. The character of the SCIENTIFIC AMERICAN is too well known throughout the country to require a detailed account of the various subjects discussed through its columns.

It enjoys a more extensive and influential circulation than any other journal of its class in America.

It is published weekly, as heretofore, in *Quarto Form*, on fine paper, affording, at the end of the year, an *ILLUSTRATED ENCYCLOPEDIA*, of over FOUR HUNDRED PAGES, with an Index, and from FIVE to SIX HUNDRED *ORIGINAL ENGRAVINGS*, described by letters of reference; besides a vast amount of practical information concerning the progress of SCIENTIFIC and MECHANICAL IMPROVEMENTS, CHEMISTRY, CIVIL ENGINEERING, MANUFACTURING in its various branches, ARCHITECTURE, MASONRY, BOTANY,—in short, it embraces the entire range of the Arts and Sciences.

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PREMIUM.

Any person sending us three subscribers will be entitled to a copy of the "History of Propellers and Steam Navigation," re-published in book form—having first appeared in a series of articles published in the fifth Volume of the Scientific American. It is one of the most complete works upon the subject ever issued, and contains about ninety engravings—price 75 cents.

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